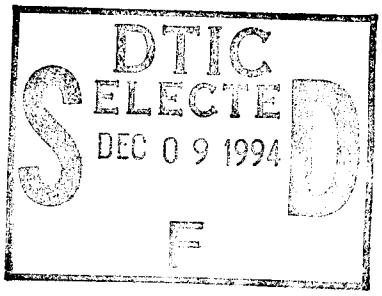
Report No. CG-D-23-94

Crew Adaptation Evaluation of the Norwegian Crew Concept (NORCREW)



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16. Abstract

This report documents an Operational Test and Evaluation (OT&E) effort conducted to assess the feasibility of replacing select traditional small boat station shore-side facilities with live-aboard vessels. The success of such a concept is dependent on the crews' ability to adapt and cope with around-the-clock operations from a restricted work and living environment. Survey and log forms were used to collect continuous data on human factors variables, at both a traditional small boat station and an experimental live-aboard concept station, to assess the impact of the live-aboard concept on crew safety and well-being.

Results of this evaluation indicate that all human factors variables were well within acceptable limits. The evaluation did not reveal any significant adverse effects on crew members which would prevent the use of the live-aboard concept in Coast Guard small boat stations which are similar to the one in the study. However, it was emphasized that although the results are positive, they may not reflect the reactions of crews in other Coast Guard small boat station environments.

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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply By	To Find	Symbol
	LENGTH			
in	inches	* 2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	MASS (WEIGHT)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
	VOLUME			
tsp	teaspoons	5	milliliters	ml
tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
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yd^3	cubic yards	0.76	cubic meters	m^3
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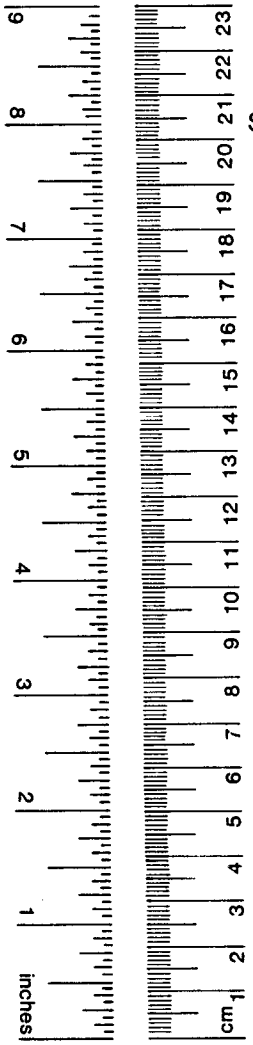
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly).



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply By	To Find	Symbol
	LENGTH			
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
	MASS (WEIGHT)			
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
	VOLUME			
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	0.125	cups	c
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
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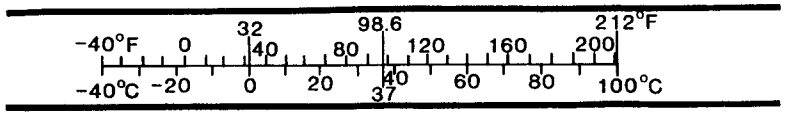

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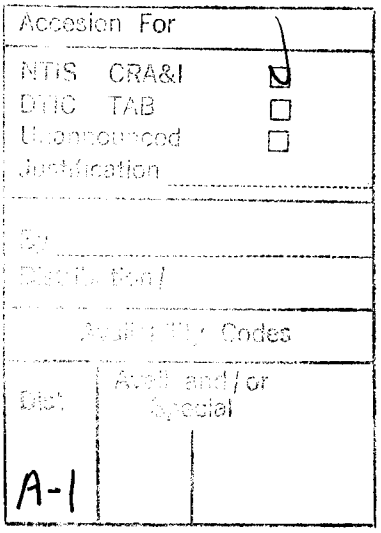
The authors would like to gratefully acknowledge the cooperation and support of BMC Mullinax, BMC Cropper and their crews in this evaluation. Their enthusiasm, experience, and professional attitude had a significant impact on the crew adaptability evaluation. We would also like to thank Sabina Webb, Anthony Masalonis, Kristin Haggis, and Michael Paley of Work Systems Research for their research and analysis support.



EXECUTIVE SUMMARY

The Coast Guard is approaching a twenty year cycle where a number of small boat stations will require significant renovations. Faced with a large capital investment, the Coast Guard must decide whether to refurbish and continue to maintain all existing small boat station facilities or evaluate alternative platforms to replace some stations. One alternative that has been suggested is a "live-aboard" concept modeled after the Norwegian Society for Sea Rescue. Under the "live-aboard" concept (NORCREW), shore-side facilities are eliminated and replaced with a live-aboard boat. These boats are equipped with not only mission related equipment, but also facilities (berthing, shower and head, food storage and preparation equipment, recreational amenities, etc.) to accommodate crew members for extended periods of time.

The projected benefits from NORCREW include: 1) Reduced Personnel Costs -- NORCREW is designed to operate with a crew of 10, two crews of five people. A typical station may be staffed with as many as 35 or as few as 19 crew members. Therefore, even stations with few personnel could reduce costs using NORCREW. 2) Reduced Maintenance Costs -- Eliminating shore-side facilities will eliminate the need for station and grounds maintenance which will not only result in less expense but also allow crews to dedicate more time to mission related duties. 3) Faster Response Time -- Since NORCREW personnel are physically onboard the vessel, they will be able to respond quicker to missions. NORCREW may result in quicker response times, over typical stations, during the SAR season, but not during the off-season (November through April) when the crew may be authorized liberty during evening hours when in Bravo-1 status. 4) Greater Flexibility in Conducting Missions -- With current arrangements, if missions are temporarily suspended, i.e. lack of visibility, crews return to small boat stations. Under the NORCREW concept, the crew can dock at the nearest marina or drop anchor since all necessary amenities are onboard the boat. This flexibility not only reduces crew fatigue associated with transiting back to the station but also decreases the response time when the mission is reinitiated.

An Operational Test and Evaluation (OT&E) was conducted to assess the feasibility of adopting the NORCREW concept to perform small boat station duties. The NORCREW concept is based on the premise that crews will be able to perform around the clock small boat duties from a restricted operational and living environment. The success of this concept is dependent on the crew's ability to adapt and cope with extended continuous work in a confined environment. As part of the OT&E, a crew adaptation evaluation, utilizing survey and log book entries to collect psychophysiological response data, was conducted to assess whether crews can perform small boat station duties from a restricted living and operational platform.

Data were collected using a specially designed Background Information Inventory (BII) and Daily Log Forms (DLFs) developed to collect qualitative and quantitative data for assessing crew adaptation to work environments. The BII is a 28-page, 119-item survey which collects data on crew demographics, sleep-wake cycles, nutrition, life-styles, and attitudes toward work. The DLF is a two or four page survey which is completed three times per day: in the morning before breakfast; in the evening before dinner; and at night before retiring to bed. The DLF survey collects daily activity and psychophysiological state data on both duty and non-duty days. Each of the DLFs include two frequently-used standard measures of sleepiness and alertness: the Stanford Sleepiness Scale (SSS) and the Naval Psychiatric Research Unit (NPRU) Mood Scale. Some of the DLFs also request data on sleep duration and quality, mission activity and affective response ratings, as well as daily activity and health symptomatology ratings.

Analysis of BII and DLF data did not reveal any significant adverse psychophysiological effects associated with the NORCREW concept. Comparisons between NORCREW and a traditional small boat station did not indicate differences which would suggest the NORCREW concept is exerting adverse effects on crew members. All human factors variables were well within acceptable limits. The main conclusions are:

- Data on sleep duration and quality, mood and fatigue, health symptomatology, eating and drinking behavior, life style satisfaction ratings, and work attitudes did not reveal any significant adverse effects and were well within acceptable limits. Therefore, there are no human factors considerations which prohibit the continuation of the NORCREW concept in the present work, geographical, operational and workload environments. However, it must be emphasized that although the present findings are positive, they may not reflect the reactions of crews in other Coast Guard small boat environments.

- Comparisons between NORCREW and conventional small boat crews did not reveal any significant differences on key human factors issues. Overall, crew members appear to adapt and cope well with the live aboard concept, exhibiting reactions similar to those of conventional small boat station crews.

- The high survey response rate, and the consistency of the data with previous literature and theory, indicate that data collection methodology used is practical and yields meaningful data.

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1.0 INTRODUCTION

The Coast Guard currently operates and maintains approximately 168 small boat stations throughout the United States. These stations provide rapid response to such mission needs as: Search and Rescue, Environmental Response, Aids to Navigation, Enforcement of Laws and Treaties, Boating Safety, and Port Safety and Security. Small boat stations range in size from small one-structure sites to large multiplex facilities. These facilities require a significant amount of resources, personnel and material, for daily maintenance and operation. The Coast Guard is approaching a twenty year cycle where a number of small boat stations will require significant renovations. Faced with a large capital investment, the Coast Guard must decide whether to refurbish and continue to maintain all existing small boat station facilities or evaluate alternative platforms to replace some stations. One alternative that has been suggested is a "live-aboard" concept modeled after the Norwegian Society for Sea Rescue. Under the "live-aboard" concept (NORCREW), shore-side facilities are eliminated and replaced with a live-aboard boat. These boats are equipped with not only mission related equipment, but also facilities (berthing, shower and head, food storage and preparation equipment, recreational amenities, etc.) to accommodate crew members for extended periods of time.

At conventional small boat stations, on-duty crews, as well as some off-duty crews, reside in shore based facilities while the boat is tied up at a near-by dock. In the live-aboard concept, on-duty crews live and perform all operational duties from onboard the boat while off-duty crews live in the community. The projected benefits from NORCREW include: 1) Reduced Personnel Costs -- The NORCREW concept is designed to operate with a crew of 10, two crews of five people. A typical station may be staffed with as many as 35 or as few as 19 crew members. Therefore, even stations with the fewest personnel could reduce personnel costs using NORCREW. 2) Reduced Maintenance Costs -- Eliminating shore-side facilities will also eliminate the need for station and grounds maintenance which will not only result in less expense but also allow crews to dedicate more time to mission related duties. 3) Faster Response Time -- Since NORCREW personnel are physically onboard the vessel, they will be able to respond quicker to missions. NORCREW may result in quicker response times, over typical stations, during the SAR season, but not during the off-season (November through April) when the crew may be authorized liberty during evening hours when in Bravo-1 status. 4) Greater Flexibility in Conducting Missions --.With current arrangements, if missions are temporarily suspended, i.e. lack of visibility, crews return to the station. Under the NORCREW concept, the crew can dock at the nearest marina or drop anchor since all necessary amenities are onboard the

boat. This flexibility not only reduces crew fatigue associated with transiting back to the station but also decreases response time when the mission is reinitiated.

While NORCREW may have appeal from an economic and efficiency perspective, the reactions of the human crews to these environments have not been addressed. The live-aboard concept has an underlying assumption that crews will be able to perform around-the-clock small boat station operational duties from a restricted living and operational environment. The success of the live-aboard concept is dependent on the crew's ability to adapt and cope with extended continuous operations from a confined environment. Although history has repeatedly demonstrated that humans are able to cope and perform quite well under an impressive and wide range of adverse situations, the impact of long-term exposure to the same adversities may be quite different. For example, working the night shift for one night is difficult but a task that most people can complete without significant changes in performance or health. On the other hand, working the night shift for months on end, is much more difficult and does result in performance and health problems (Monk, 1990; Moore-Ede and Richardson, 1985; Koller, 1983). Therefore, it is important to determine whether long-term exposure to the NORCREW concept may have a negative impact on crew health/safety and performance.

An Operational Test and Evaluation (OT&E) was conducted to assess the feasibility of implementing NORCREW in certain small boat station environments. This report documents the crew adaptation evaluation of the OT&E whose objective was to assess the impact of live-aboard operations on crew safety and well-being. This evaluation used survey and daily log entries to collect data on human factors variables, which have been used in previous research to assess human coping and adaptation to work environments, to determine whether crews can perform small boat station duties from a restricted living and operational platform.

2.0 METHOD

2.1 Samples

Two USCG small boat stations operating in the same geographic region, exposed to similar environmental conditions, mission profiles, and mission workload levels, participated in this evaluation. At one station, NORCREW, shore-based facilities were replaced with a 50-foot live-aboard boat. At the second station, comparison (COMP), a traditional small boat station with

shore-based facilities was maintained. In all, 32 crew members were available and volunteered to participate in the evaluation. Due to varying subject sample sizes, demographic information is presented in the results section.

Three work schedules were proposed for NORCREW: 2 days on/2 days off, 4 days on/4 days off, and 7 days on/7 days off. However, during a brief evaluation period of each schedule option, it was realized that the limited storage capacity (food and clothing) onboard the boat could not accommodate long duty schedules (4 days on/4 days off or 7 days on/7 days off). For capacity reasons, as well as similarity to previous station and COMP schedule, the 2 days on/2 days off was selected for the evaluation. Under this schedule, NORCREW personnel are on-duty two days and off-duty two days. COMP maintained a 2/2/2 rotation schedule where crews rotate from two days of 24-hour on-duty status at the station, to two days of day-duty (report to the station in the morning and are relieved in the afternoon but remain on-call if emergencies arise), to two days of off-duty.

2.2 Measures

In selecting methods and variables as candidates for use in this assessment, care was taken to design measurement tools which would not, in any way, interfere with the efficiency of station operations. Whenever possible, only time-proven methods and variables from previous related research were used for this evaluation (Hoddes, Zarcone, Smythe, Phyllips and Dement, 1973; Johnson and Naitoh, 1974; Gander, Myhre, Graeber, Andersen and Lauber, 1985; Tepas, Armstrong, Carlson, Duchon, Gersten, and Lezotte, 1985). Two sets of forms were designed for this study: a Background Information Inventory (BII) and Daily Log Forms (DLFs).

2.2.1 Background Information Inventory (BII)

The BII is a 28-page, 119-item survey requesting information on such factors as crew demographics, sleep/wake cycles, nutrition, life-style, attitudes toward work, and other general predictors of adaptation to work environments. For the most part, BII items came from three sources: U.S. Navy research on the operational consequences of sleep deprivation (Johnson and Naitoh, 1974), private sector and NIOSH research conducted by the current researchers on industrial workers employed on shiftwork and other unusual work schedules (Tepas, et al, 1985), and from the Standard Shiftwork Index developed by overseas investigators for European Community studies (Barton, Folkard, Smith, Spelten, and Totterdell, 1991). A copy of the BII can be found in Appendix A.

2.2.2 Daily Log Forms (DLFs)

The DLFs are brief two or four page forms to be completed both on-and off-duty on a daily basis. Three color coded DLFs were designed: DLF1 (yellow) is completed at breakfast time; DLF2 (ivory) is completed before dinner; and DLF3 (green) is completed at bed time. Each of these forms include two frequently-used standard measures: the Stanford Sleepiness Scale (SSS), a validated measure of sleepiness and alertness (Hoddes, et al, 1973); and the Naval Psychiatric Research Unit (NPRU) Mood Scale, a validated measure of sleep deprivation developed by the U.S. Navy (Johnson and Naitoh, 1974). Some of the DLFs also request data on sleep duration and quality, mission activity and affective response ratings, as well as daily activity and health symptomatology ratings. A copy of each of the DLFs can be found in Appendix B.

2.3 Procedure

Prior to data collection, researchers met with station personnel to discuss the purpose and objectives of the study, requirements for participating crew members, and to answer questions. Individuals were informed that participation was voluntary. If they choose to participate, they were not committed to finish the assessment and could terminate participation at any time during the project. Participants were also informed that their identity and responses would be confidential and anonymous. To ensure anonymity and confidentiality, crew members were assigned code numbers and all forms and data files were identified with code numbers only. Also, an independent research firm was contracted to collect, enter and analyze all data. Crew members were given business cards with their personal code number and the phone number of the consulting firm and encouraged to phone if they had any questions or special problems during the evaluation.

Following the briefing, independent researchers administered and collected BIIs from participating crew members. Researchers were available while BIIs were being completed to answer questions. Upon completion of the BII by the entire group, DLFs were administered and instructions provided. DLF1 (yellow) was to be completed in the morning prior to any food intake, coffee was excluded. DLF2 (ivory) was to be completed at dinner time, prior to intake of food. DLF3 (green) was to be completed prior to nightly sleep. DLFs were completed at the specified times on a daily basis for both workdays and non-workdays. Crew members were instructed to use self-addressed stamped envelopes, provided with DLFs, to mail completed forms directly to the

independent researchers on a daily basis. As daily forms were completed, crew members were instructed to place the completed forms in that day's envelope and not refer to completed forms at a later time. Once the final form (DLF3) was completed for that day, individuals were instructed to seal and mail the envelope. Daily mailings were used to: 1) reduce the possibility of crew members referring back to previous day response ratings; 2) assess whether forms are being completed correctly; 3) early detection of problems with the measurement tools or concept which may require intervention; and 4) ensure that DLFs are being completed on a daily basis.

Since the primary objective of this study was to assess whether crews could perform small boat station duties from a restricted living and operational environment and since crews only live onboard the boat during search and rescue (SAR) season, (May through October), data collection activities were restricted to SAR seasons. It should be noted that during the off-season, the crew may be authorized liberty during evening hours when in Bravo-1 status. However, due to schedule and resource limitations, only August and September were available for data collection in the 1992 SAR season. Given time restrictions, limited crew member exposure to the NORCREW concept, and untested measurement techniques in the current environment, a preliminary data collection was undertaken during the 1992 SAR season (Phase I). Phase I data collection provided a baseline estimate of the effects of NORCREW on crew psychophysiological variables following the introduction of the concept, as well as an operational test to assess the acceptability, feasibility and sensitivity of the selected measurement methods and variables. Phase I data collection was limited to NORCREW personnel. These individuals voluntarily completed BIIs and maintained DLFs for a period of 36 days.

Phase II data collection was conducted during the 1993 SAR season. Phase I data collection procedures were used and data were collected at both NORCREW and COMP. At NORCREW, the BII was administerd once, at the onset of data collection, and crew members maintained DLFs for a period of 92 days. At COMP, all available personnel volunteered and completed BIIs. Unfortunately, due to time and resource restrictions, maintaining DLFs on all individuals at COMP was not feasible. In order to reduce DLF data collection at COMP to an acceptable size and duration, COMP BII data were analyzed and individuals who matched NORCREW personnel on age, gender, Coast Guard experience, and rate/rank, were selected to maintain DLFs. These individuals also completed the BII at the onset of data collection but only maintained DLFs for a period of 36 days. Figure 1 provides a graphical representation of the data collection approach.

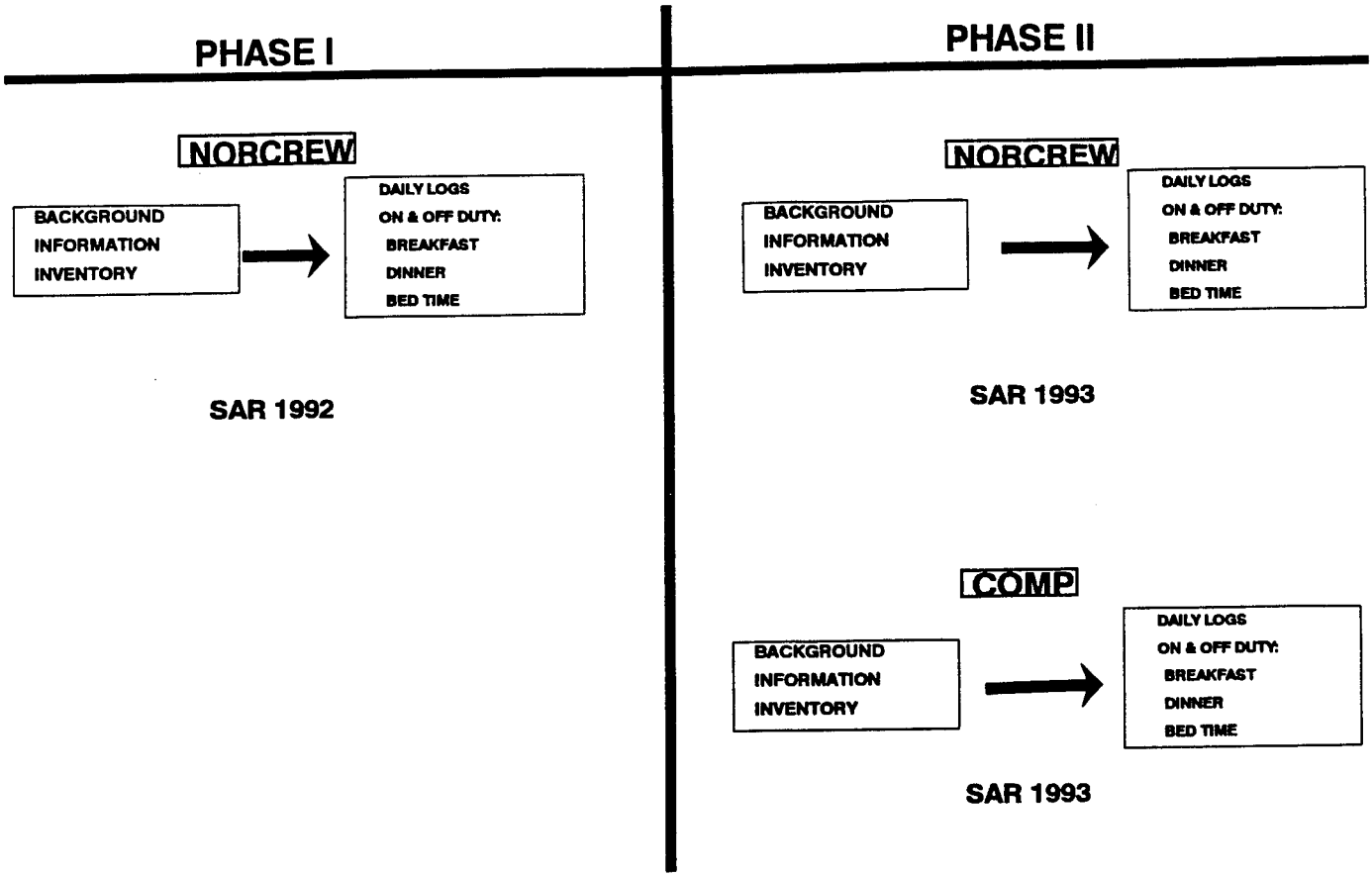

Figure 1. Study plan.

2.4 Data Analysis

2.4.1 Phase I

As noted above, the Phase I data collection should be considered test bed data to demonstrate the feasibility of the measurement techniques. Since NORCREW was not fully staffed, the crew had very limited exposure to the concept, and measurement tools were untested in a small boat environment: analysis of these data was limited to the calculation of descriptive statistics and will not be discussed in any detail.

2.4.2 Phase II

Phase II BII data analysis was also limited to descriptive statistics. This was done because the very modest differences in the data rendered speculation about differences meaningless. Also, for most variables the small number of respondents placed severe statistical limitations on any data

analysis. Inferential statistics were computed for DLF data. Where appropriate, 2x2 or 2x2x3 repeated measures, mixed factorial Analyses of Variance (ANOVAs) were computed with **location** (NORCREW and COMP), **status** (on-duty and off-duty) and **time** (morning, afternoon, and night) as independent-variables.

3.0 RESULTS

3.1 Phase I

As previously indicated, Phase I data were analyzed to assess whether measurement tools, variables, and/or the methodological approach required modification. Eight, all male, NORCREW crew members, with an average age of 29 years and 7.1 years of Coast Guard experience, voluntarily completed BIIs and maintained DLFs. The response rates for the BII and DLFs was 100% and 87.3% respectively. Crew members expressed that DLF response rate would have been higher but that work and family emergencies prevented certain individuals from completing all of their DLFs. Analysis of these data revealed that the methodological approach was acceptable to crew members and that measurement tools and variables were feasible and sensitive, requiring only minor adjustments. However, the data did reveal a deficiency in the staffing requirements for the NORCREW concept. Specifically, the data indicated that an eight person staff was insufficient to absorb temporary reductions in crew associated with training, personal leave, accident/injury leave, etc. and still maintain an adequately staffed vessel to handle mission requirements. It was determined that the NORCREW concept required two additional crew members to ensure adequate staffing. Also, the current NORCREW crew compliment, all male, could not accommodate an assessment of gender issues. In response to these deficiencies, two female crew members were assigned to NORCREW for the 1993 SAR season bringing the crew size to ten and introducing mixed gender crews.

3.2 Phase II

As mentioned previously, 10 crew members were available at NORCREW and 22 at COMP. However, due to schedule and resource constraints, a matched sample of 10 COMP crew members was selected for participation in DLF data collection. However, because of missing data, two of the 10 COMP crewmembers were eliminated from DLF analyses. Therefore, all DLF analyses are based on a matched sample of 10 NORCREW and 8 COMP crew members. Table 1

the demographic information for NORCREW, the complete COMP sample (N=22), and the matched COMP sample (N=8). As can be seen from the table, the matched sample provides a more homogenous subject population.

Table 1. Crew demographics.

	NORCREW	COMP (N=8)	COMP (N=22)
AGE	29	27.5	24.8
CG EXPERIENCE	7.7	6.9	4.6
JOB TENURE	1.7	1.6	1.7
RANK TENURE	2.6	2.8	2.0

The response rate for the BII was 100% for both sites. The response rate for DLFs was 76.6% and 63.9% for NORCREW and COMP, respectively. Figure 2 shows the DLF response rate for NORCREW and COMP.

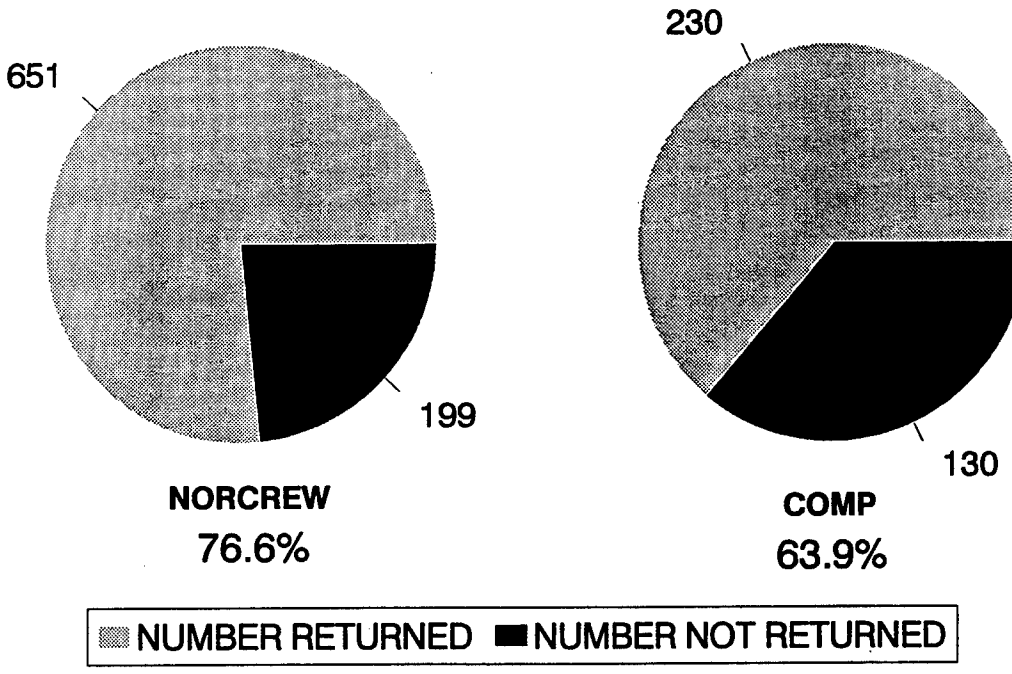

Figure 2. Daily Log Form response rates.

3.2.1 Background Information Inventory (BII)

The major objective of the BII data is to assess the "typical" behavior of individuals on factors which have exhibited relationships with adaptation to work environments in previous research. In general, the BII data revealed that NORCREW and COMP crew members experienced similar levels of "typical" behavior on BII factors. Figure 3 shows the average response of the two groups when asked to rate using a four-point scale "...how well you think you were prepared for these characteristics as part of your present duty assignment." Figure 4 shows the average response of the two groups when asked to rate "...how well you think these characteristics are handled in your present duty assignment." In both cases, the mean ratings are nearly always below the mid-point of the scale used, suggesting that most of the crew members at both sites perceived themselves as **not** being well prepared and ready. Figure 5 provides a good example of the remarkable similarity of the perceptions and responses of these two groups as measured by the BII. Crew members were asked to rate, how tense, tired, and alert they feel in a number of call-related situations: waiting for a call; on the way to a call; at the call; returning from a call; and back at the station.

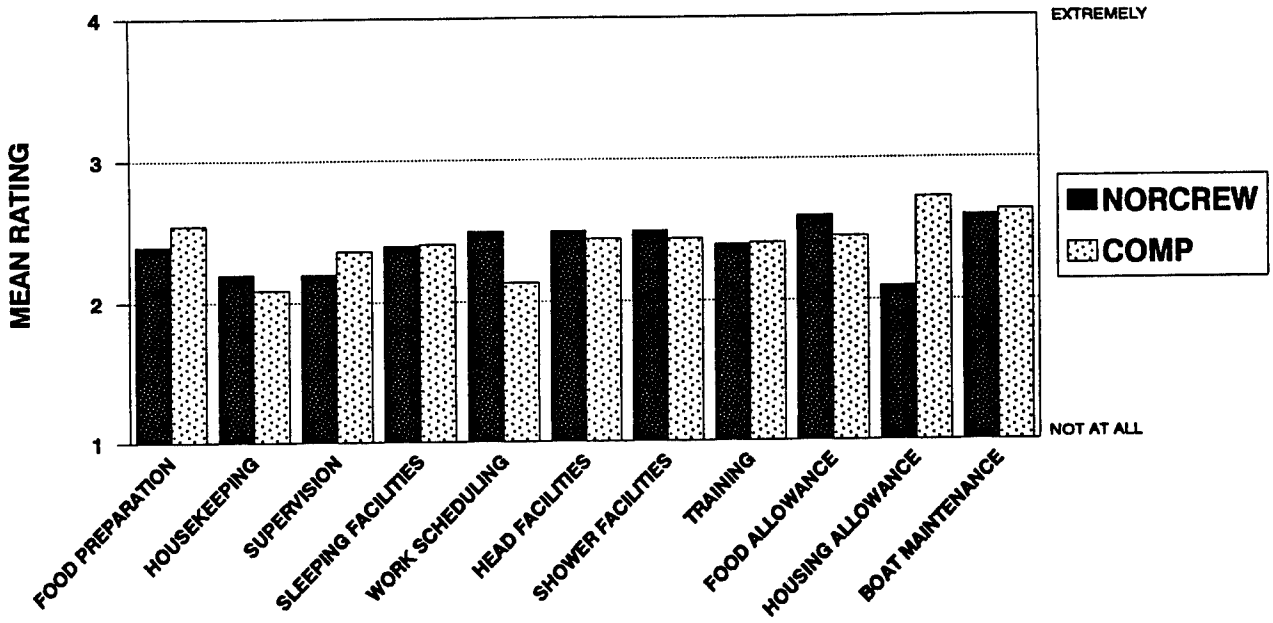

Figure 3. Judgment of how well each member thinks s/he was prepared for these characteristics of their present assignment.

Note: Ratings were made on a four-point scale with 4 = Extremely, 3 = Quite a bit, 2 = A little, and 1 = Not -at-all.

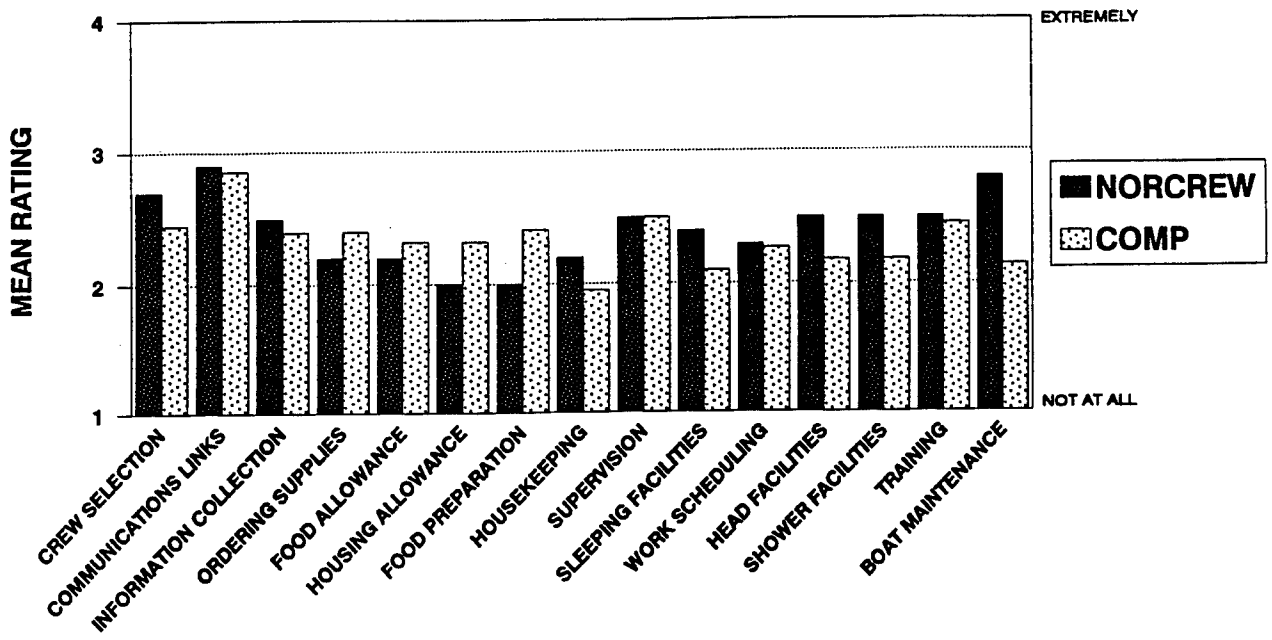

Figure 4. Judgment of how well these characteristics are handled in the present duty assignment.

Note: **Ratings were made on a four-point scale with 4 = Extremely, 3 = Quite a bit, 2 = A little, and 1 = Not -at-all.**

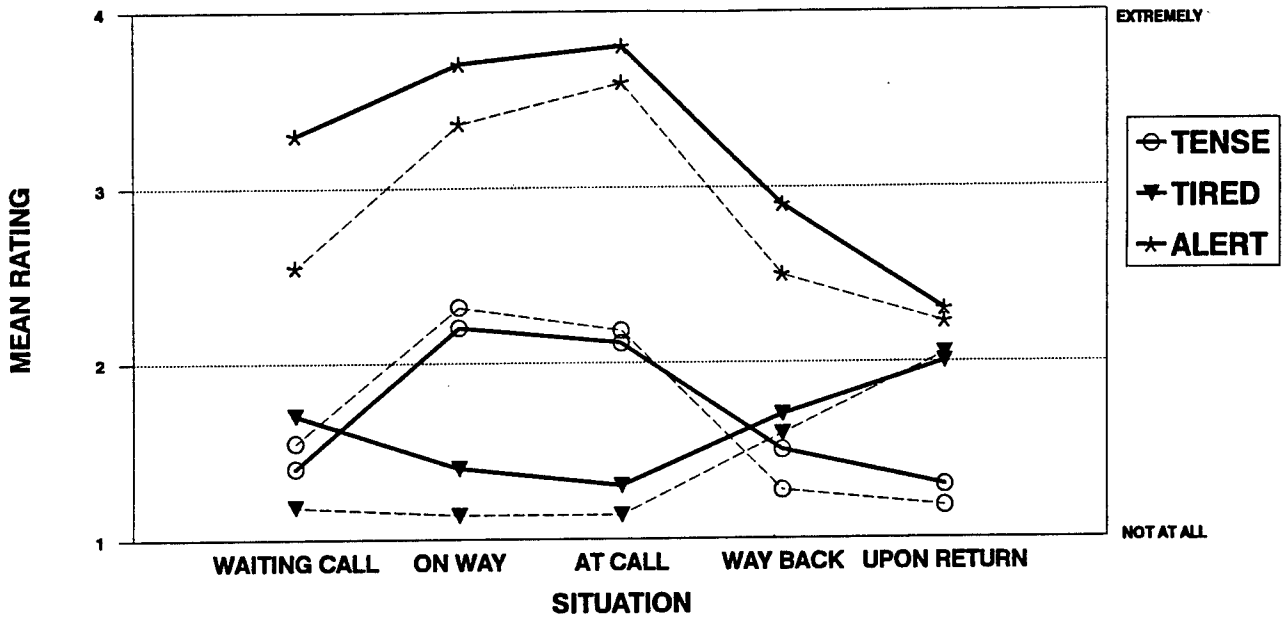

Figure 5. How crew members feel in these call-related situations.

Note: **Ratings were made on a four-point scale with 4 = Extremely, 3 = Quite a bit, 2 = A little, and 1 = Not -at-all. The SOLID line represents data from NORCREW. The HATCH line represents data from COMP.**

As this figure 5 depicts, feelings of tension, fatigue and alertness fluctuate as mission status changes. These fluctuations are consistent in both NORCREW and COMP data. Tension and alertness peak on the way to a call but decrease on the way back from a call and at the station. On the other hand, crews report feeling less tired on the way to and at the call and more tired on the way back and at the station. Previous research on firefighters has shown similar patterns of change (Paley, Masalonis and Tepas, 1992).

One area of concern with a live-aboard concept is crew diet or nutrition. Currently, most small boat stations are staffed with a subsistence specialist who is responsible for supplying and preparing meals. Under the NORCREW concept, the subsistence specialist is eliminated, leaving individual crew members responsible for supplying and preparing their own meals. A significant concern with this concept is that crew eating habits and nutrition may deteriorate with the absence of the substance specialist. However, comparisons between numerous eating, appetite, and nutritional questions did not reveal any differences between NORCREW and COMP. The mean responses to two eating/diet questions on the BII are presented in the next two figures. Figure 6 shows crew member responses to the question "How satisfied are you with your eating habits and overall eating pattern?" Figure 7 shows crew member responses to a question asking them to compare their workday and home diets

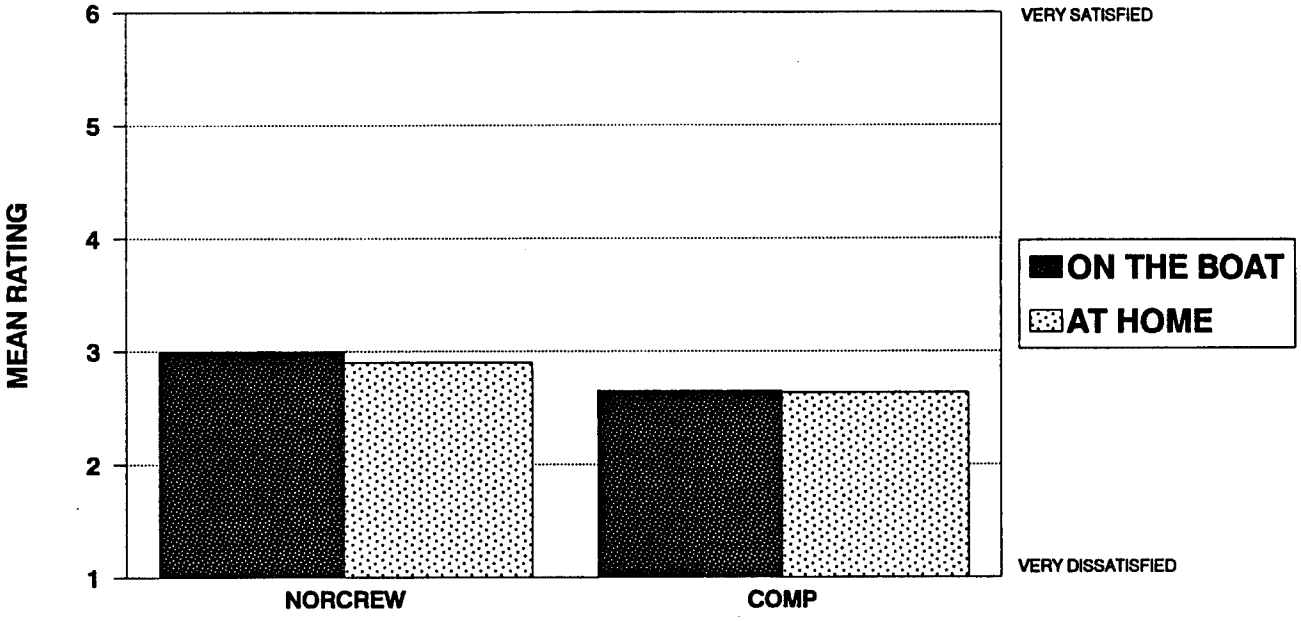

Figure 6. How satisfied are you with your eating habits?

Note: Ratings were made on a six-point scale with 6 = Very satisfied and 1 = Very dissatisfied

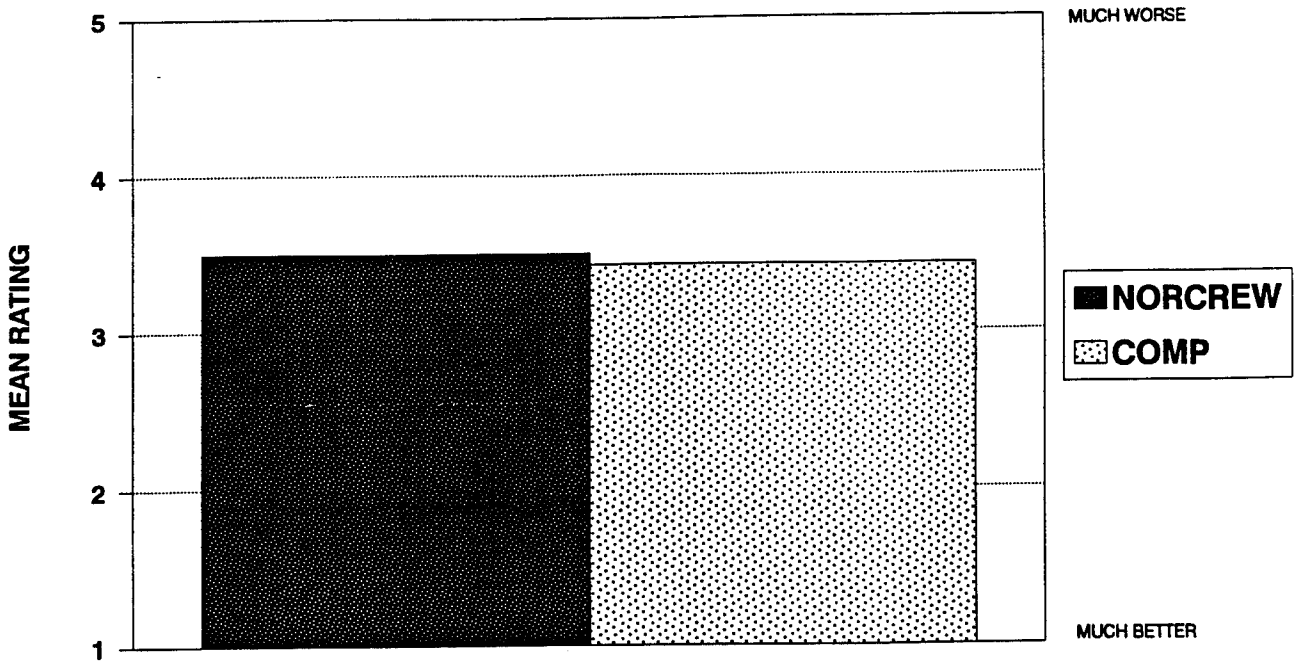

Figure 7. Is your workday diet better or worse than your home diet?

Note: Ratings were made using a five-point scale with 1 = Much better, 3 = Similar, and 5 = Somewhat worse.

Although these two figures reveal that eating habits and diet ratings are at or below the scale mid-points, suggesting room for improvement in these areas, the ratings are consistent for workday and home. Therefore, since crew members appear to have poor eating habits in general, as suggested by the home ratings, the elimination of the subsistence specialist should not compromise crew diet and eating habits with this concept.

Given the restricted living and work environment, the potential for crew friction and conflict may be elevated with a live-aboard concept. However, Figure 8 shows the response of crew members to the question "How would you describe your working relationship with other crew members?" This figure reveals positive average ratings and little difference between the two stations.

As noted earlier, due to the statistical limitations imposed by the small crew sizes, many of the BII variables could not be evaluated in this project. Of particular interest is the rate of substance use (smoking, caffeine, alcohol, medication, etc.) which may be indicative of coping difficulties. Reductions in the size of both groups makes accurate assessment difficult, if not impossible. However, if one stays within the limits of the present study, it is reasonable to suggest that there is no evidence of excessive substance use by either station.

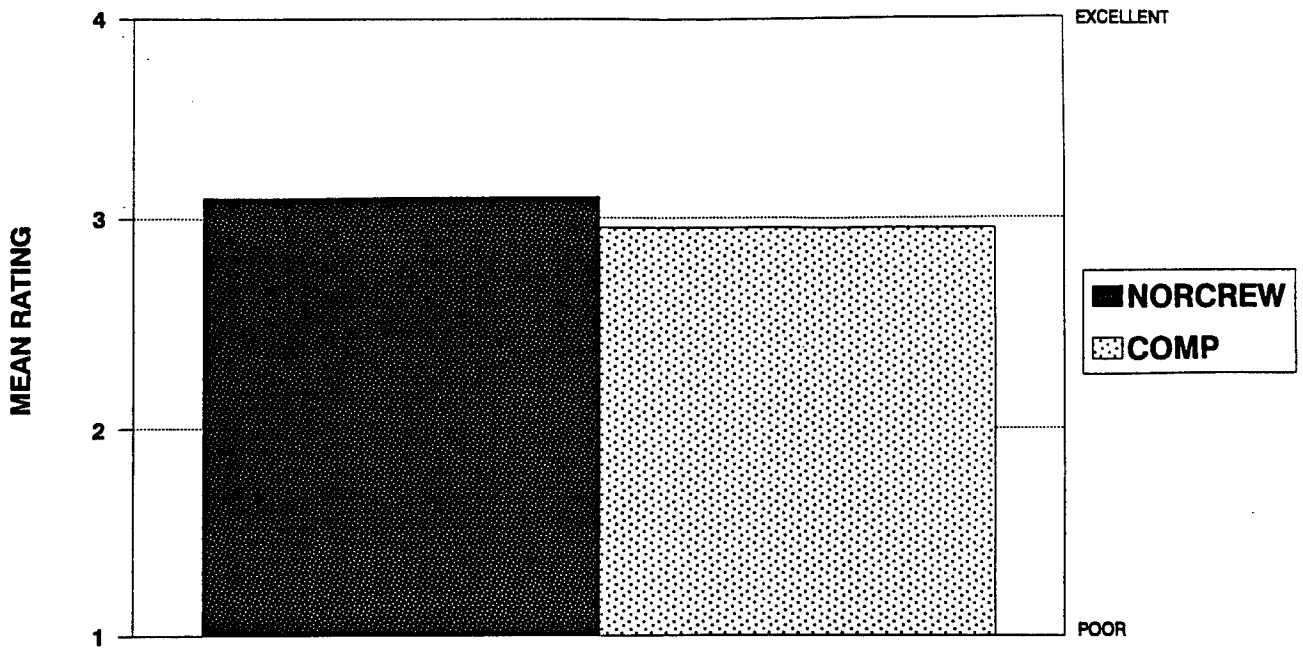

Figure 8. How would you describe your working relationship with other crew members?

Note: Ratings were made using a four-point scale with 1 = Poor, 2 = Fair, 3 = Good, and 5 = Excellent.

Figure 9 shows the response of crew members when asked "How acceptable or unacceptable do you find the use of this survey as a method to help in the evaluation of your work environment?

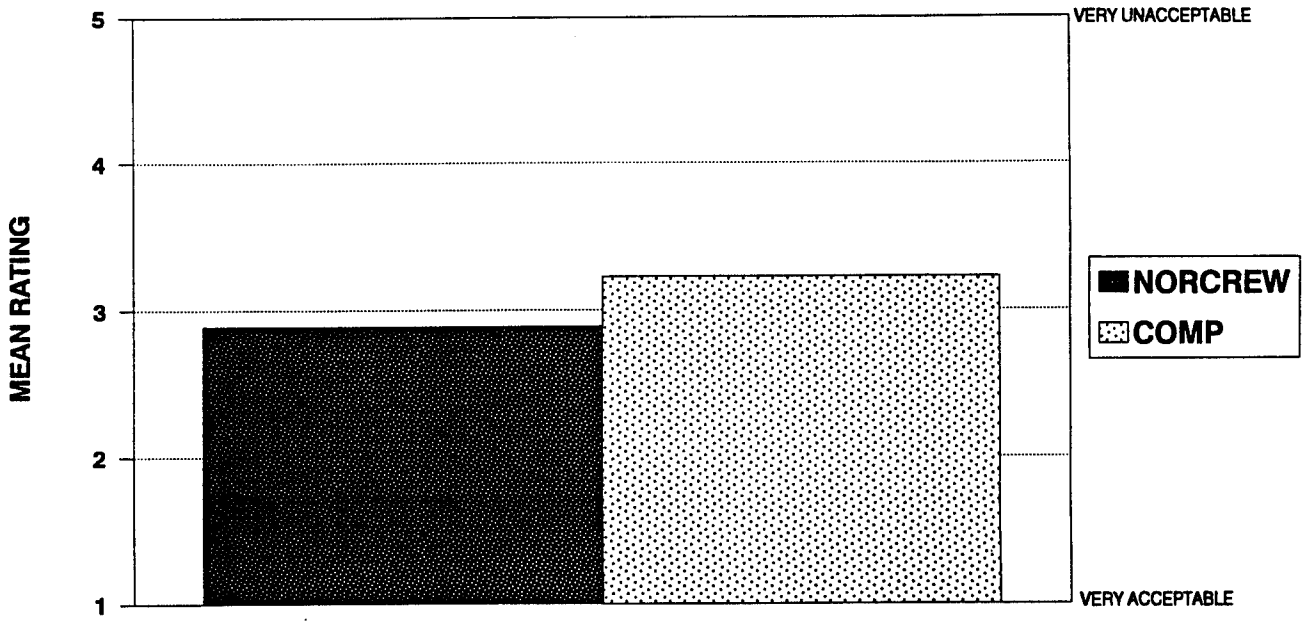

Figure 9. How acceptable or unacceptable do you find the use of this survey method to help in the evaluation of your work environment?

Note: Ratings were made using a five-point scale with 1 = Very acceptable, 2 = Moderately acceptable, 3 = Slightly acceptable, 4 = Moderately unaccaptable, and 5 = Very unacceptable.

The mean acceptability ratings shown in this figure are in the slightly acceptable to very acceptable range. It is interesting to compare this figure with the DLF response rates shown in Figure 2. As one might expect, there appears to be a positive relationship between how acceptable crew members rate the survey method and their subsequent DLF response rate.

3.2.2 Daily Log Forms (DLFs)

One advantage of DLFs over BII is that crew response data is captured in the context or environment which precipitated the reaction. In doing so, one may be able to identify predisposing factors which contribute to observed crew reactions. Also, collecting data over the course of a day will allow for assessing time-of-day effects which have been well documented in other work environments.

3.2.2.1 Sleep Length

One of the more significant and robust markers for the impact of unusual work schedules and environments is sleep length (Tepas and Monk, 1987). Figure 10 shows the mean sleep length, in minutes, for crew members on- and off-duty.

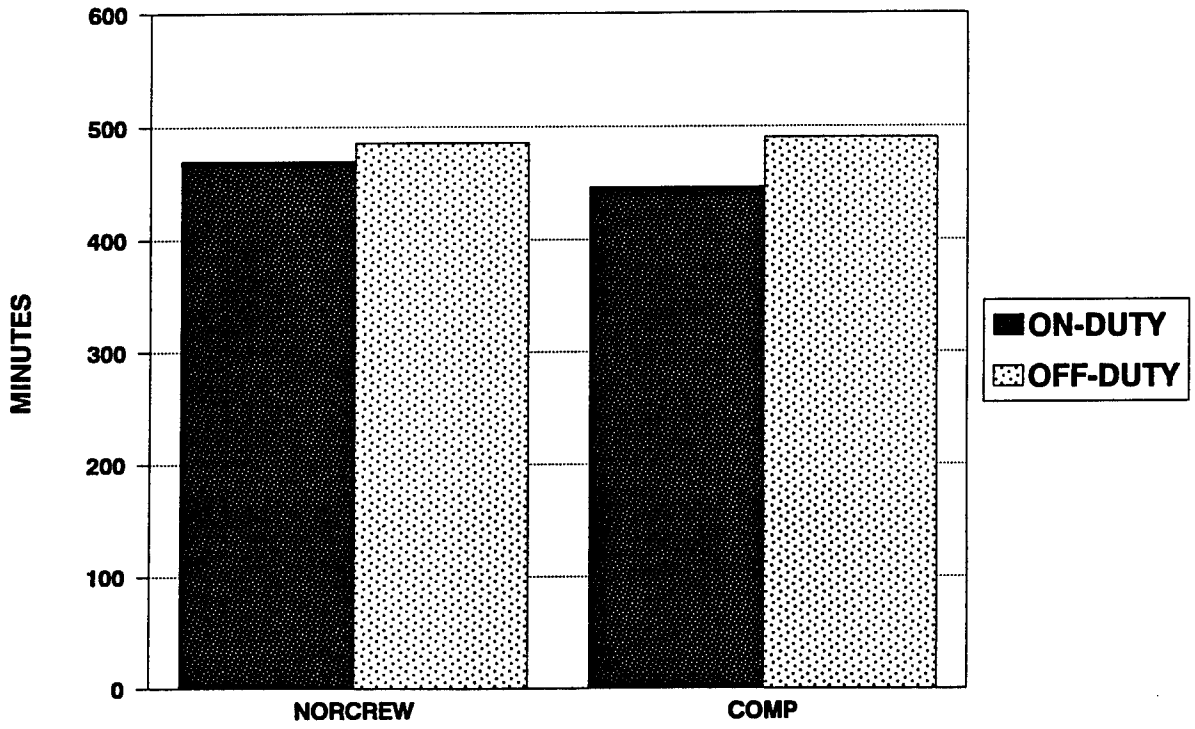

Figure 10. Sleep length.

An ANOVA , as specified earlier, for sleep length data did **not** reveal a significant **location** (NORCREW vs. COMP) effect, $F(1,16)=0.76$. There was a significant **status** (on- vs. off-duty) effect, $F(1,12)=4.66$, $p<0.05$. The interaction of location and status was **not** significant, $F(1,12)=0.79$. The significant increase in sleep length when off-duty was expected and is consistent with the work schedules literature (Tepas and Carvalhais, 1990). The failure to demonstrate a location effect supports the hypothesis that the NORCREW concept does **not** exert any greater negative impact on crew member sleep, on or off duty, than conventional small boat stations.

3.2.2.2 Sleepiness

Sleepiness was measured three times per day using the **SSS** (Hoddes, et al, 1973). Figure 11 shows the mean **SSS** ratings for crew members while on-duty and Figure 12 shows the ratings for crew members while off-duty. The ANOVA for these data revealed a significant **time** (breakfast, dinner, bed time) effect, $F(2,32)=18.22$, $p<0.0001$. ANOVA F values for **location** ($F(1,16)=0.08$), **status** ($F(1,16)=0.10$), and all four interaction effects were **not** significant. The significant difference for time is consistent with work schedule literature (Paley and Tepas, in press). The failure to demonstrate a location or status effects supports the hypothesis that the NORCREW concept did **not** have a negative impact on crew member sleepiness.

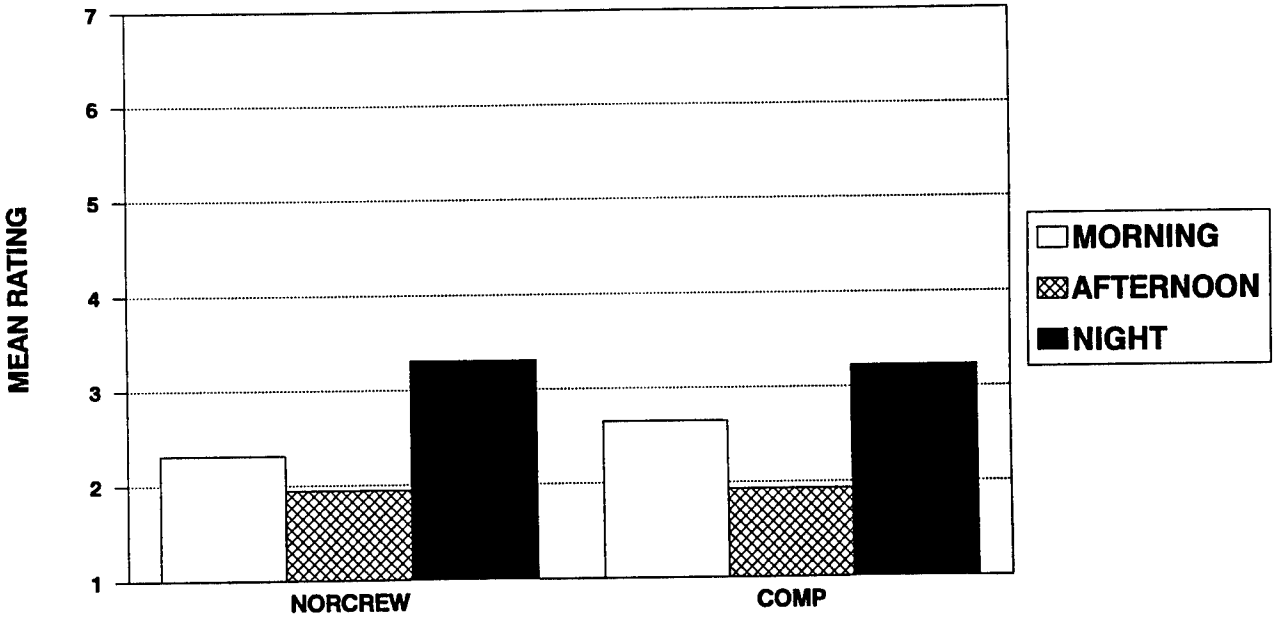

Figure 11. Stanford Sleepiness Scale (SSS): Ratings while on-duty.

Note: SSS ratings can range in value from 1 = feeling active and vital, to 7 = sleeponset soon, losing struggle to remain awake

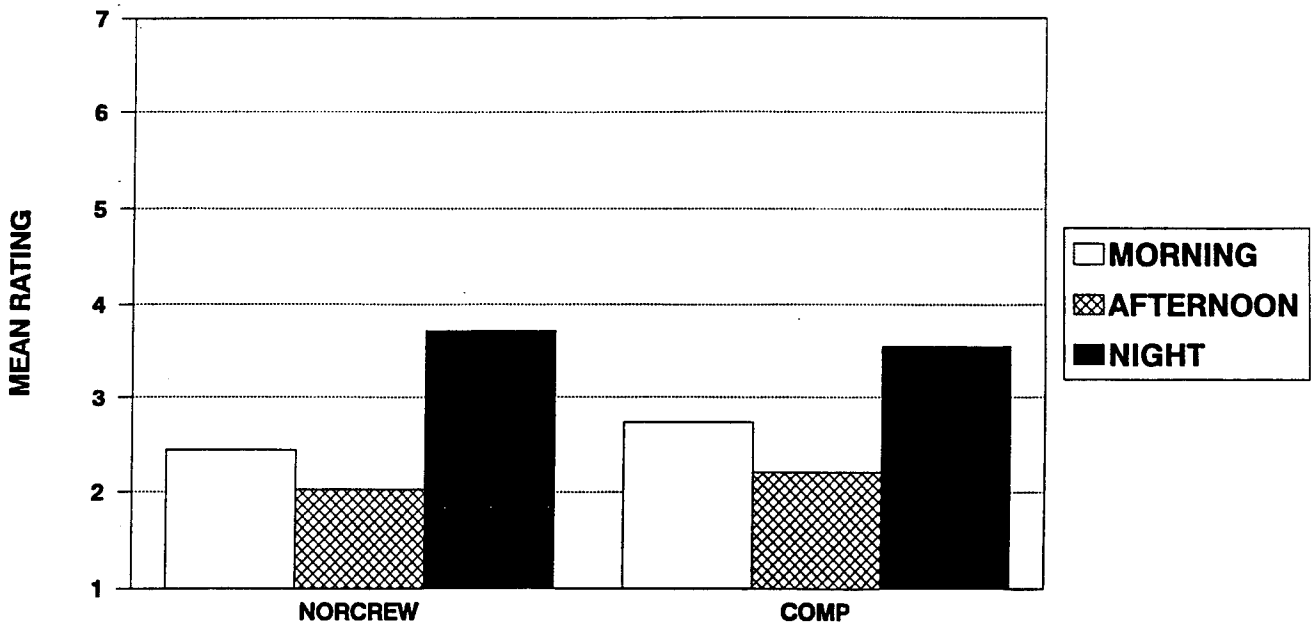

Figure 12. Stanford Sleepiness Scale (SSS): Ratings while off-duty.

Note: SSS ratings can range in value from 1 = feeling active and vital, to 7 = sleeponset soon, losing struggle to remain awake

In Figure 13, the three daily SSS ratings were averaged together to demonstrate the similarity of ratings when location or status were varied.

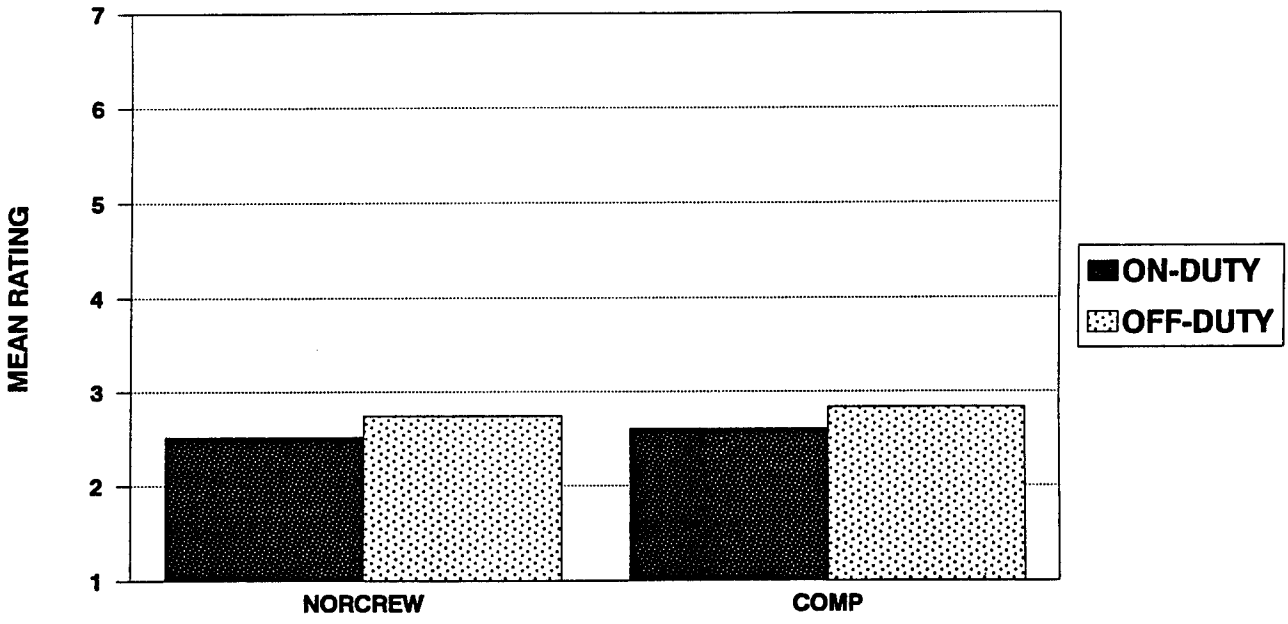

Figure 13. Stanford Sleepiness Scale (SSS): Average daily rating.

Note: SSS ratings can range in value from 1 = feeling active and vital, to 7 = sleeponset soon, losing struggle to remain awake

3.2.2.3 Mood

Mood was measured using the Naval Psychiatric Research Unit (NPRU) Mood Scale (Johnson and Naitoh, 1974). The NPRU, developed by the U.S. Navy, is a well validated measure of sleep deprivation. The measure includes two separate scales, a Positive and a Negative scale, which in most cases are negatively correlated. Separate analyses were computed for each of the scales. The ANOVA results for the mood data parallel those for the SSS. Both Negative and Positive Mood showed a significant **time** effect, $F(2,32)=10.57$, $p<0.0003$ and $F(2,32)=14.51$, $p<.0001$, respectively. **Location**, **status**, and interaction effects were **not** significant for either scale.

Again, the significant differences for time are consistent with the work schedules literature (Paley and Tepas, in press). The failure to demonstrate any other effects also supports the hypothesis that the NORCREW concept did **not** have an adverse impact on crew mood. Average Negative and Positive Mood ratings are shown in Figures 14 and 15, respectively. These figures demonstrate the similarity of ratings when location or status are varied.

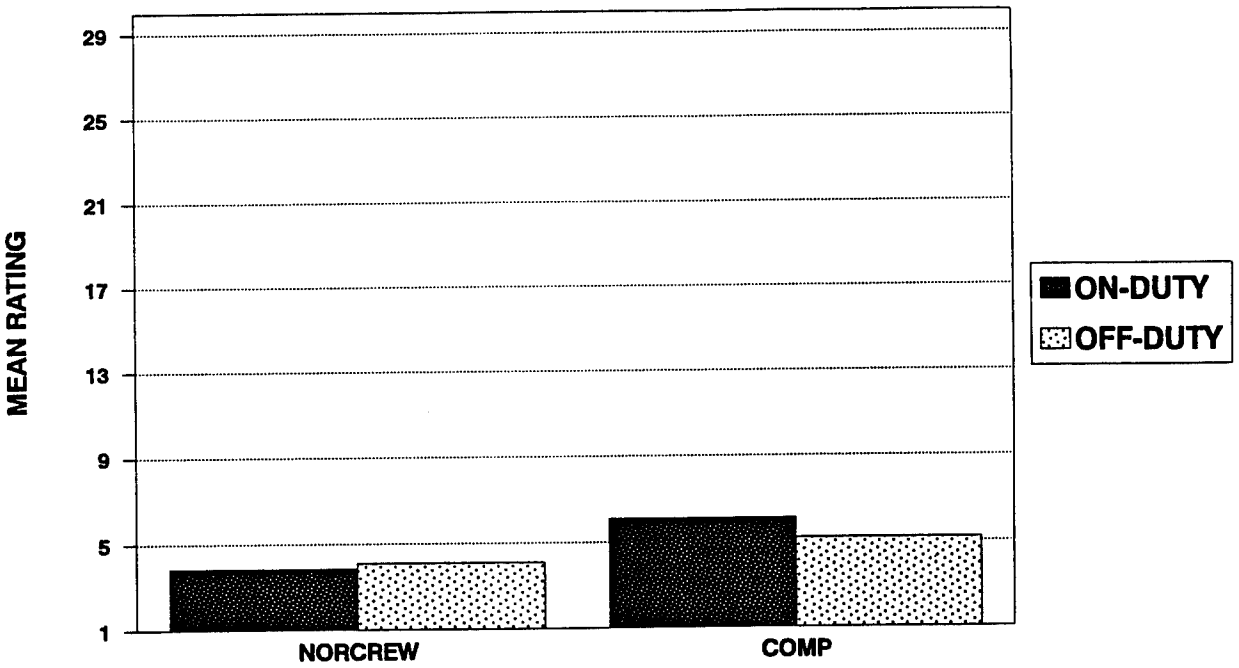

Figure 14. NPRU Negative Mood Scale: Average daily rating.

Note: NPRU Negative ratings can range in value from 0 to 30, with 30 indicating the most Negative rating

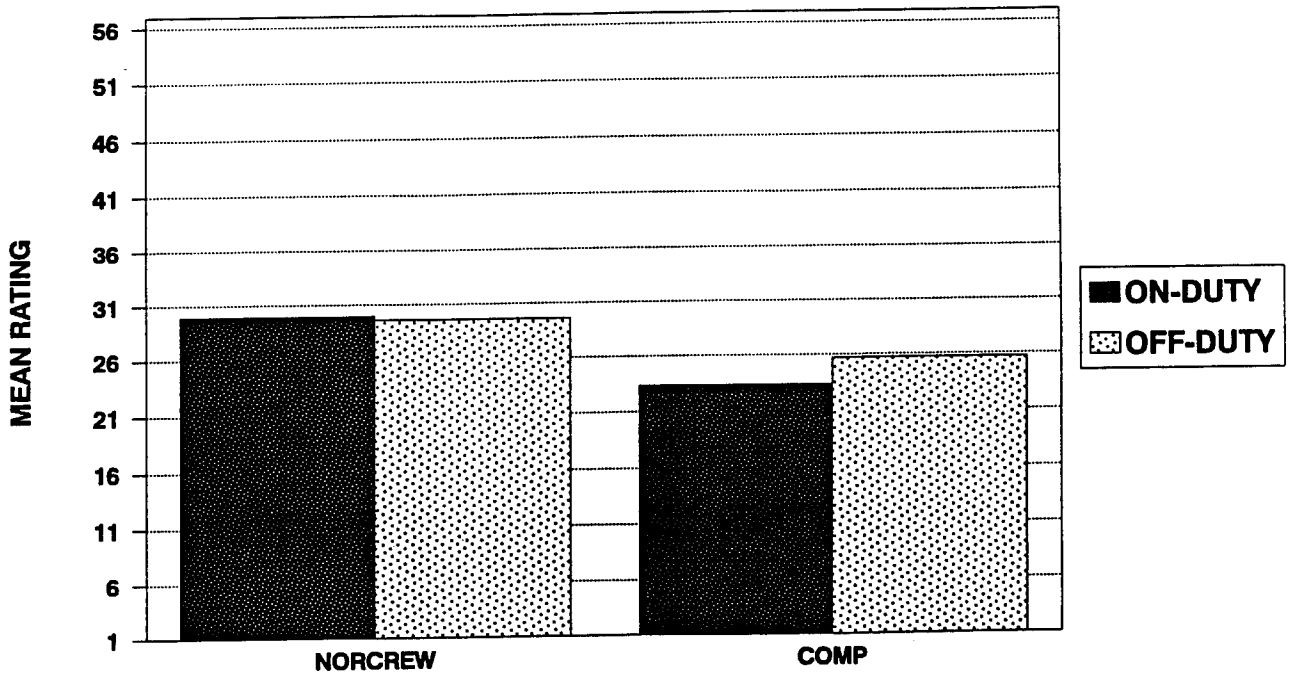

Figure 15. NPRU Positive Mood Scale: Average daily rating.

Note: NPRU Positive ratings can range in value from 0 to 57, with 57 indicating the most Positive rating

3.2.2.4 Sleep Problems

Crew members were asked a number of questions about the quality of their sleep in DLF1. Analyses of these data revealed statistically significant differences between NORCREW and COMP for most sleep quality variables (Length of time to fall asleep, difficulty falling and staying asleep, waking up during the night, difficulty getting up in the morning, and waking up disoriented, confused, and irritable). Two examples of these effects are **sleep latency** (estimated time to fall asleep) and the number of **times woken up** during a sleep period. Figure 16 shows the average sleep latency, in minutes, for crew members. The ANOVA for these data revealed a significant effect for **location**, $F(1,16) = 10.77$, $p < .001$. The effect for **status** was **not** significant. Figure 17 shows the times woken up reports from these crew members. Consistent with the sleep latency, the times woken up data only revealed a significant effect for **location**, $F(1,16) = 59.49$, $p < .001$. Overall, NORCREW crew members had less difficulty falling and staying asleep, were woken up less frequently, had less difficulty getting up in the morning, and woke up less disoriented, confused and irritable than COMP crew members.

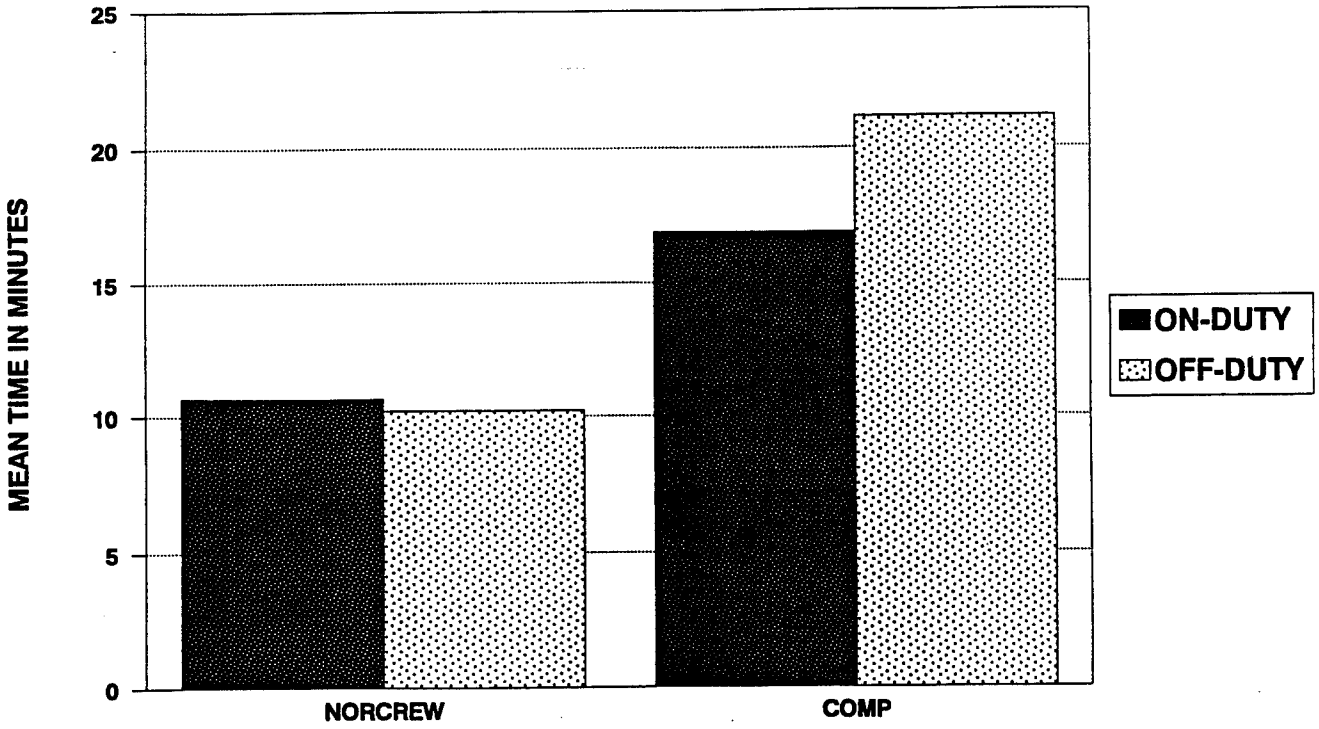

Figure 16. Time taken to fall asleep: Average daily ratings

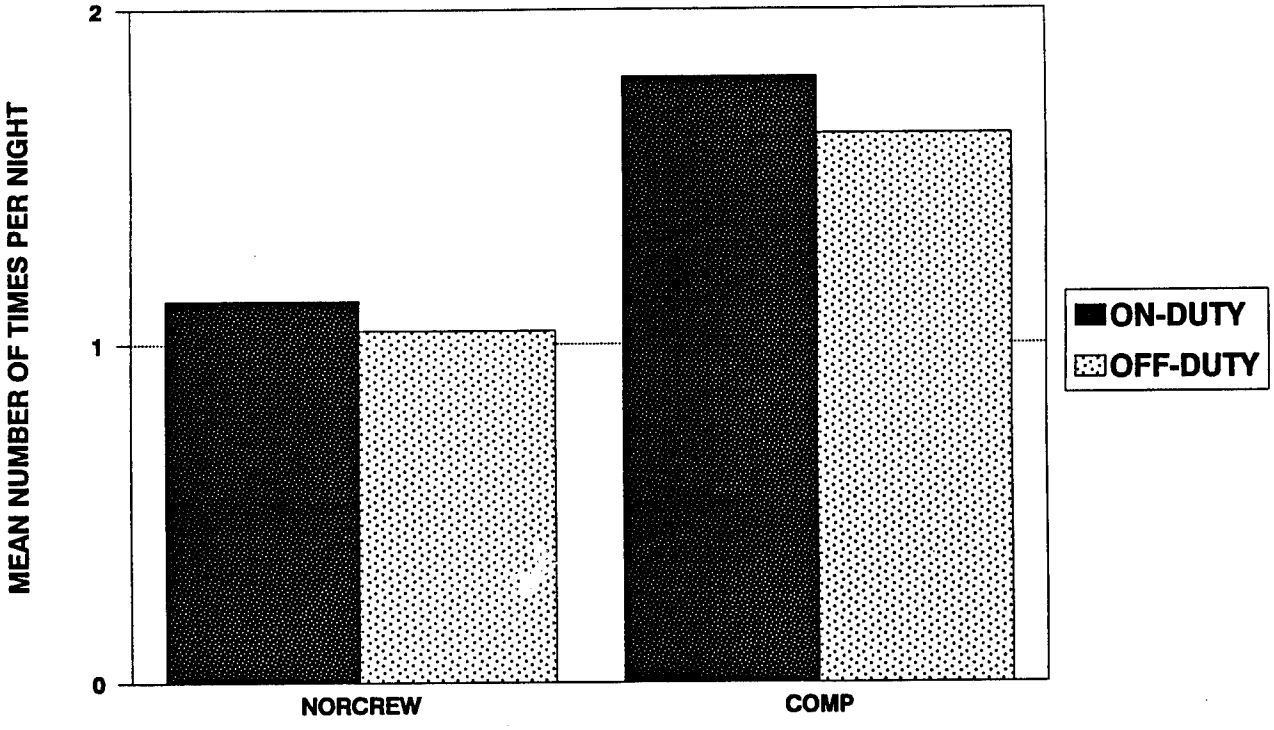

Figure 17. Number of times woken up: Average daily rating.

In general, the data revealed that NORCREW experienced better quality sleep than COMP, however, it must be emphasized that neither station experienced **poor** sleep. Both stations experienced good quality sleep with NORCREW experiencing slightly better sleep. These data suggest the tentative notion that under some circumstances the NORCREW concept may promote better sleep, or that neither environment adversely effects sleep quality.

3.2.2.5 Mission-Call Reports

Crew members were asked to report and classify mission related calls. NORCREW reported 67 calls during the 92 days of DLF data collection while COMP reported 20 calls during 46 days. The NORCREW DLF data collection period lasted the longest and involved the largest number of calls. Figure 18 provides a breakdown of the types of calls received. The "Other" category includes such missions as training, public relations activities, area-of-responsibility familiarization activities, etc.). Unfortunately, due to small sample sizes, it was not possible to determine the effects of number of calls or call types on crew responses. It is possible, but not probable, that the results of this evaluation may be related to the differential distribution of call types.

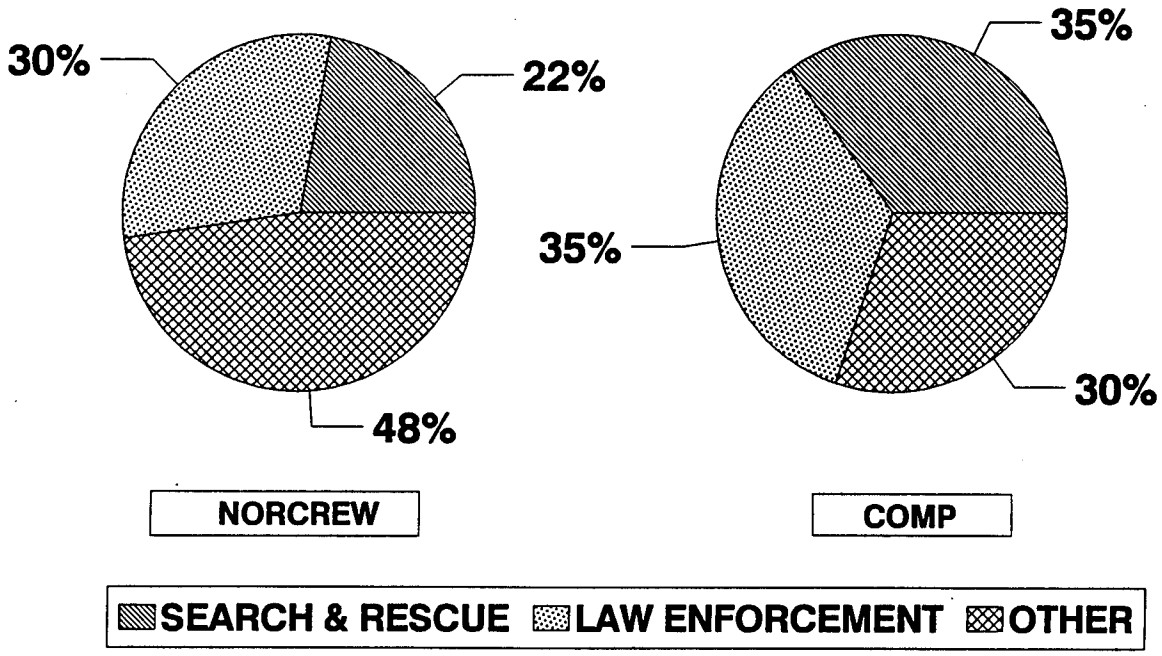

Figure 18. Calls reported on Daily Log Forms.

3.2.2.6 Daily Symptom Reports

Crew members were also asked, on a daily basis, to report how often they experienced a variety of symptoms when on-duty (DLF3). These symptoms and the resulting data are presented in Figure 19. Symptoms were reported at a very low rate, and no trends were clearly evident. Given the low ratings made and the small number of crew members participating in this study, the application of additional statistical procedures to these data does not appear to be appropriate.

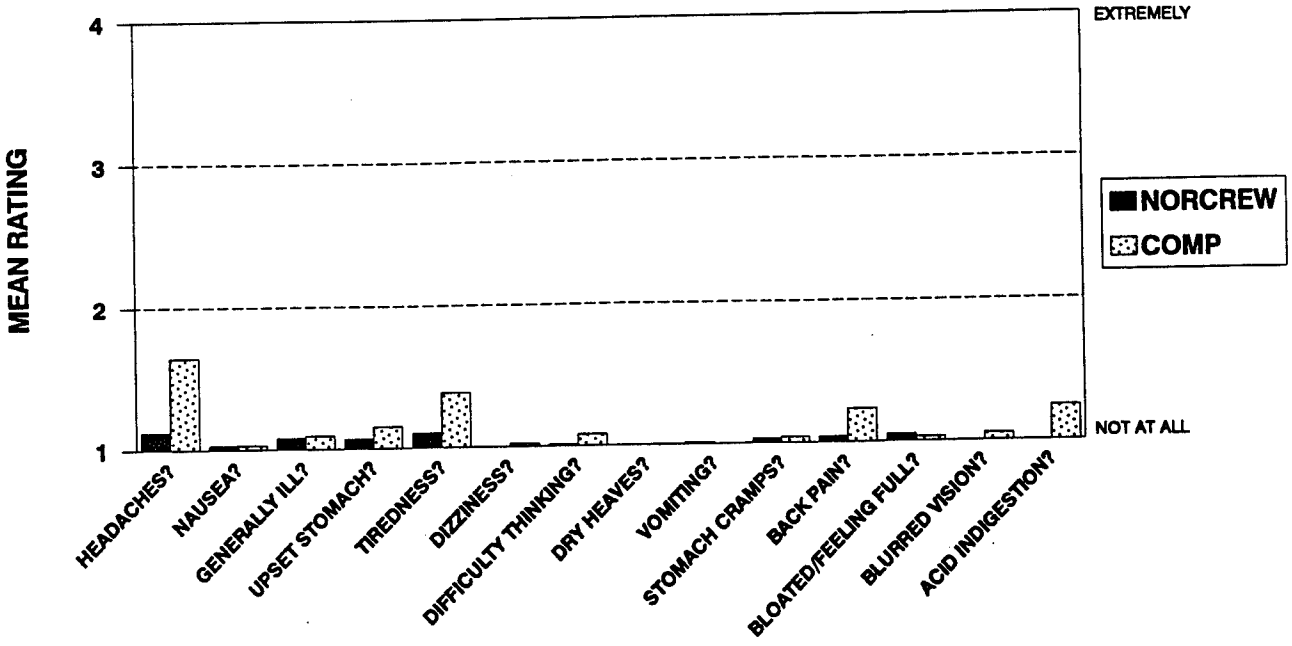

Figure 19. On-duty ratings of: On the whole how often did you feel the following symptoms today?

Note: A four-point rating scale was used with 1 = Not-at-all, 2 = A little, 3 = Quite a bit, and 4 = Extremely

3.2.2.7 Open-Ended Comments

DLF3 ended with a space requesting additional comments from crew members. Participants were encouraged to enter any information they thought might be helpful in explaining the daily responses. Many "open-ended comments" were received and examined by the consulting firm. Midway through Phase II, a number of these comments by several NORCREW members suggested a serious decline in working relationships between crew members. Details of these comments cannot be stated without violating survey confidentiality. The variables promoting these complaints are not clear, but the comments should not be ignored or casually dismissed. It is important to note that there was no apparent problem in crew member working relationships at

the start of Phase II, as suggested by the data presented earlier in Figure 8. Also, a DLF question asking crew members to rate the acceptability of crew interactions did not reveal any negative effect. In fact, an analysis of this question revealed an increase in positive ratings as the evaluation period progressed. It is possible that the open-ended comments were reactions to an isolated event and do not reflect long-term effects of exposure to confined environments. To date, we have found no evidence to suggest that crew interaction problems had any lasting significant negative impact on the human factors variables included in our analysis.

4.0 SUMMARY AND DISCUSSION

The purpose of the crew adaptation evaluation was to ensure that long-term exposure to the NORCREW concept would not adversely affect crew safety/health and well being. Data on psychophysiological variables, which have been identified as predictors of adaptation to work environments, were collected over numerous days at the NORCREW station and a comparison conventional small boat station. The results of this evaluation suggest that the potential for chronic adverse impact of the NORCREW concept is minimal. Data on sleep duration and quality, mood and fatigue ratings, symptomatology, eating and drinking behavior, life style satisfaction ratings, work attitudes, and a host of other human factors variables did not reveal any significant adverse effects. All observed factors were well within acceptable limits. Comparisons between NORCREW and COMP did not indicate differences which would suggest the live aboard concept is exerting adverse effects on crew members.

It is interesting to note that the only statistically significant difference between NORCREW and COMP was in the area of sleep quality. These analyses revealed that the NORCREW environment may be more conducive to better quality sleep. One possible reason for this effect is that NORCREW crew members maintain similar sleep times. Since all crew members are on-duty, they typically retire and awake at similar times. This practice not only allows crew members to synchronize sleep behavior but also reduces external sleep distracters (light, noise, etc.) which may be produced if people have varying sleep/wake times. In comparison, COMP may have upwards of 10-15 people, on- and off-duty, at the station on any given day. Under these conditions, a large number of individuals most of which are off-duty, crew members do not coordinate sleep/wake times. Also, the availability of recreational activities (TVs , stereos, pool tables, etc.) provide alternatives to sleep, as well as potentially creating disruptions for those attempting to sleep.

Analyses of mood and alertness variables revealed time-of-day effects consistent with chronobiological theory. It has been well documented that human functions possess a predictable cycle which varies as a function of time of day. Disruptions to these cycles have been shown to adversely affect sleep duration and quality, affective responses, performance, and overall well being (Monk, 1990; Moore-Ede and Richardson, 1985; Koller, 1983). Since the present data reveal a time-of-day function which is consistent with conventional thought and chronobiological theory, it is safe to conclude that the live aboard concept, under the current evaluation conditions, does **not** appear to disrupt the cycles of observed human factors variables.

Significant changes in sleep, sleepiness and mood were observed for on-duty vs. off-duty. In each case, these changes were consistent with the expectations from chronobiological and work schedules research literature. This demonstrates that the variables measured were sensitive and reliable. Thus, we conclude that the measures used do have the ability to detect significant human factor problems, if they occur. The failure to detect any significant differences between NORCREW and conventional small boat station operations clearly suggests that further consideration of this concept is warranted.

The high voluntary response rates obtained in this project confirm expectations that the methods used are both practical and feasible. The primary limitation of the present study is the small number of subjects at the NORCREW station. For example, gender issues could not be addressed to any degree since only two females were available at both stations. The power of this approach could be significantly enhanced if larger samples of BII and DLF data, gathered from crews employed in more traditional small boat operations, were available. That is, with a larger comparison data base, one would have more reliable crew member response **norms** and thereby one could make more accurate comparisons. A larger comparison population would allow one to precisely draw small comparison samples which would match the test crew population better and allow for more precise comparisons.

Given the statistical limitations of the present study, the results should be approached with caution and respect. For example, the crew member relationship problems reported in the open-ended comments may be simply a function of who was assigned to the NORCREW crew, and may therefore be unrelated to the NORCREW concept itself. However, these reports may be the first sign of a serious problem associated with chronic exposure to NORCREW operations over long-term periods of time. Should the NORCREW concept be accepted in other operational environments, it is important that it be implemented with a comprehensive human factors

evaluation plan in place. It is possible that operations in more severe environments or with higher workloads (greater number and longer missions) may yield human factors problems not evident in the current project. Failure to evaluate future NORCREW efforts could lead to serious and costly problems. With a good human factors evaluation plan in place from the beginning, conceptual or implementation flaws could be quickly detected and appropriate interventions introduced at minimum cost. To address these concerns, the Coast Guard is in the process of implementing the NORCREW concept in additional operational environments to conduct further evaluations.

In conclusion, the current evaluation of the NORCREW concept did not reveal any significant adverse effects on crew members which should prevent the use of this concept in Coast Guard small boat station environments which are similar to the one in this study. It should be clearly understood that the data presented in this report do indicate that the live-aboard concept of NORCREW is operational and merits further consideration.

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APPENDIX A

ID # _____

UNITED STATES COAST GUARD

BACKGROUND INFORMATION INVENTORY

Assessments of Coast Guard Operational Environments

INSTRUCTIONS FOR PARTICIPATION

The questions contained in this booklet are designed to provide us with a better understanding of the factors which affect the human component in Coast Guard operations. Factors such as sleep wake cycles, nutrition, life-style, and attitudes towards work have been identified as predictors of adaptability to working environments. This questionnaire seeks to explore many of these dimensions in an attempt to better understand and provide strategies to increase the safety and efficiency of Coast Guard operations.

Each question has been selected from other inventories or specifically designed to examine the factors which have demonstrated past relationships with work adaptation. Most of the questions have no right or wrong answers. Please read each question carefully and mark the response which ***BEST*** reflects your feelings. Do not spend a lot of time on each one, your ***FIRST*** answer is usually the best. It is important that you answer each answer even if you are unsure.

While this questionnaire is lengthy, it can be completed in less than one hour, and represents an extremely critical aspect of this assessment. ***Your identity and responses to the questionnaire will be completely protected***. Above all, your contribution to this effort is of utmost importance since without your feedback one can not accurately assess the potential problem areas in our Coast Guard Environment. Your responses are valuable to provide more safe and productive work environments for yourself and fellow crew members. Your participation is greatly appreciated!!

Do not place your name on the inventory and mark all answers in the space provided. Remember, the questions should NOT be discussed with anyone else and the entire inventory should be completed without interruption if possible.

1) Today's date: _____ Day _____ Month _____ Year

2) What is your age in years? _____

3) What is your sex? ☐ Male ☐ Female

4) What is your height? _____ feet _____ inches

5) What is your weight? _____ lbs.

6) What is your marital status? ***(circle the appropriate letter)***

a.	married	c.	divorced	e.	living with someone
b.	single	d.	separated	f.	widowed

7) In the spaces provided below, please enter the **number** of people in your ***household*** **(NOT** including station living) which are in each of the following age groups (***excluding yourself***)?

a) 0 to 5 years _____
b) 6 to 12 years _____
c) 13 to 18 years _____
d) 19 to 24 years _____
e) 25 to 60 years _____
f) 60 + years _____

8) How many of these persons need looking after by **you**? _____

9) How long have you been with the Coast Guard? ____ years ____ months ____ weeks

10) How long have you been in your current assignment? ____ years ____ months ____ weeks

11) What is your present **rate** ***(eg. BM, MK, SN, etc.)***? _____

12) How long have you been in your present **rate**? ____ years ____ months ____ weeks

13) What is your present **rank** *(eg. First Class, Third Class, Chief, etc.)*? _____

14) How long have you been in your present **rank**? ____ years ____ months ____ weeks

15) On a *typical* work schedule rotation, how many days would you **stand duty** on *weekdays* and *weekends* in a 30 day period? *(fill in blanks)*

	Number of duty days
Weekdays	days
Weekends	days

16) On a *typical* work schedule rotation, how many **days off** would you have on *weekdays* and *weekends* in a 30 day period? *(fill in blanks)*

	Number of days off
Weekdays	days
Weekends	days

17) On your *present* work schedule rotation, how many days do you **stand duty** on *weekdays* and *weekends* in a 30 day period? *(fill in blanks)*

	Number of duty days
Weekdays	days
Weekends	days

18) On your *present* work schedule rotation, how many **days off** do you have on *weekdays* and *weekends* in a 30 day period? *(fill in blanks)*

	Number of days off
Weekdays	days
Weekends	days

19) How long have you been on your **present** work schedule rotation? ____ years ____ months ____ weeks

20) In the spaces below, please specify at what **time-of-day** your ***typical*** workday usually **'start'** and **'end'** on ***weekdays*** and ***weekends***? ***(fill in blanks in military time)***

	Start time	End time
Weekdays		
Weekends		

21) In the spaces below, please specify at what **time-of-day** your ***present*** workday usually **'start'** and **'end'** on ***weekdays*** and ***weekends***? ***(fill in blanks in military time)***

	Start time	End time
Weekdays		
Weekends		

22) How long have you been on the ***present*** work **'start'/'end'** times? ____ years ____ months ___ weeks

23) If you are married, is your **spouse employed** outside the home? ***(check one)***

	Yes, part-time
	Yes, full-time
	No
	Not married

24) In general, how acceptable or unacceptable is your **present** work schedule to **you**?***(check one)***

	Very unacceptable	Moderately unacceptable	Slightly unacceptable	Slightly acceptable	Moderately acceptable	Very acceptable
Duty 'start'/'end' times						
Number of days 'off'						

25) If you live with someone, how does your **partner** feel about your work schedule? ***(check one)***

	Extremely unsupportive	Somewhat unsupportive	Indifferent	Somewhat supportive	Extremely supportive
Duty 'start'/'end' times					
Number of days 'off'					

26) All other things being equal, would **you** prefer to give up working your present work schedule and get a day-time job? (***check one***)

Definitely not	Probably not	Maybe	Probably yes	Definitely yes

27) In general, how acceptable or unacceptable is your present work schedule to your **family** ? (***check one***)

	Very unacceptable	Moderately unacceptable	Slightly unacceptable	Slightly acceptable	Moderately acceptable	Very acceptable
Duty 'start'/'end' times						
Number of days 'off'						

Questions 28 thru 34 refer to your sleep behavior when you are ***OFF DUTY***:

28) At what time do you usually **go to bed**: _____ and **get up**: _____ (***fill in blanks in military time***)

29) How long does it usually take you to **fall asleep**? _____ hours _____ minutes

30) How many times do you **wake up** during a typical night's sleep? _____

31) Do you take **naps**?(***check one***) ☐ Yes ☐ No

If **YES**, how often do you take them? (***check one***)

	5 days a week
	4 days a week
	3 days a week
	2 days a week
	1 day a week
	Less than 1 day a week

32) How much **sleep** do you feel you get? (***check one***)

Too little		Enough		Too much

33) How often do you: (***check the appropriate box***)

	Not at all	A little	Quite a bit	Almost always
Have difficulty falling asleep?				
Have difficulty staying asleep?				
Wake up during the night?				
Have difficulty getting up in the morning?				
Have restless or disturbed sleep?				
Disturb the sleep of other people?				
Wake up confused, disoriented, irritable?				

34) How often is your sleep **disrupted** during the night or at sleep onset because of: (***check the appropriate box***)

	Almost never	Quite seldom	Quite often	Almost always
Heat or cold?				
Light?				
Noise?				
Quality of bed?				
Some other environmental factor?				
People?				

Questions 35 thru 41 refer to your sleep behavior when you are ***ON DUTY***

35) At what time do you usually **go to bed**: _____ and **get up**: _____ (***fill in blanks in military time***)

36) How long does it usually take you to **fall asleep**? _____ hours _____ minutes

37) How many times do you **wake up** during a typical night's sleep? _____

38) Do you take <u>naps</u>?(*check one*) ☐ Yes ☐ No

If <u>YES</u>, how often do you take them? (*check one*)

	5 days a week
	4 days a week
	3 days a week
	2 days a week
	1 a week
	Less than 1 a week

39) How much <u>sleep</u> do you feel you get? (*check one*)

Too little		Enough		Too much

40) How often do you: (*check the appropriate box*)

	Not at all	A little	Quite a bit	Almost always
Have difficulty falling asleep?				
Have difficulty staying asleep?				
Wake up during the night?				
Have restless or disturbed sleep?				
Have difficulty getting up in the morning?				
Disturb the sleep of other people?				
Wake up confused, disoriented, irritable?				

41) How often is your sleep <u>disrupted</u> during the night or at sleep onset because of: (*check the appropriate box*)

	Almost never	Quite seldom	Quite often	Almost always
Heat or cold?				
Light?				
Noise?				
Quality of bed?				
Some other environmental factor?				
People?				
Respond to calls?				

42) Rate your average **workday**: (***check one box for each item***)

	Extremely low	Quite low	Average	Quite high	Extremely high
Physical workload					
Mental workload					
Pace of work					
Number of SAR calls					
Number of LE calls					
Boredom					
Alertness					
Activity level					
Stress					
Sleepiness					
Fatigue					
Tension					
Training					

43) The following items relate to how **you generally feel**, please **check the boxes** which indicate the degree to which the following statements apply to your own normal feelings. (***check one box for each item***)

	Not at all		Somewhat		Very much
I generally feel I have plenty of energy					
I usually feel drained					
I generally feel quite active					
I feel tired most of the time					
I usually feel full of vigor					
I usually feel rather lethargic					
I generally feel alert					
I often feel exhausted					
I usually feel lively					
I feel weary much of the time					

44) How would you rate your own overall **physical fitness** level? (***check one***)

Poor	Fair	Good	Excellent

45) How well does your present duty result in **activity** which allows you to maintain your present physical fitness level? (*check one*)

Not at all	A little	Quite a bit	Extremely

46) Which of the following responses best describes your **typical state** during work? (*check one*)

Sleepy	Somewhat sleepy	Somewhat alert	Alert	Very alert

47) About how often do you feel **tired** at work? (*check one*)

Never	Less than once a month	Once or twice a month	Once a week	Two or three times a week	About every day

48) About how often do you feel **sleepy** at work? (*check one*)

Never	Less than once a month	Once or twice a month	Once a week	Two or three times a week	About every day

49) One hears about "**Morning" and Evening**" types of people, which **ONE** of these types do you consider yourself to be? (*check one*)

Definitely 'Morning'	More 'Morning' than 'Evening'	More 'Evening than 'Morning'	Definitely 'Evening'

50) Which response best describes your **general health**: (*check one*)

Poor	Fair	Good	Excellent

51) How often do you usually see a **doctor** about your health? (*check one*)

Two or three times a year	About once a year	About once every two years	Less than once every 2 years

52) Are you ***presently*** being treated for any illness, injury or mental health problem? ☐ Yes ☐ No

If **YES**, please specify the **problem** and any **medication** you have taken as treatment (***please print***)

_____

_____

53) Is there anything in your **medical history**, such as surgery, etc., that is relevant to your present health or ability? ☐ Yes ☐ No

If **YES**, please specify: (***please print***)

_____

_____

54) Please indicate **how often** you experience the following,: (***check the appropriate box***)

	Never	Less than once a month	Once or twice a month	Once a week	Two or more times a week
Headaches?					
Disturbed appetite?					
Upset stomach?					
Nausea or vomiting?					
Heartburn or stomach-aches?					
Digestion difficulties?					
Bloated stomach or flatulence?					
Pain in your abdomen?					
Heart palpitations?					
Constipation?					
Diarrhea?					
Muscle soreness?					
Body aches and pains?					
Dizziness?					
Shortness of breath?					
Swollen feet?					
Blurred vision?					
Trouble concentrating?					
Tingling or numbness?					
Tiredness?					
Back pain?					
"Tightness " in your chest?					
Other?					

55) Have you taken any of the following **non-prescription medications** for prolonged periods **(more than three months)?** ***(check the appropriate box)***

	Before starting current assignment	**Since starting current assignment**	**Never**
Aspirins or headache medicine			
Cough and cold medicine			
Antacids			
Laxatives			
Sleeping pills			
Vitamins			
Birth control pills			
Medicine to give you energy			
Others:			

56) Do you use tobacco products?(***check one***) ☐ Yes ☐ No

If **YES**, how much tobacco do you **use** per day (***enter amount in the appropriate box(s)***)?

	Before starting current assignment	**Since starting current assignment**	**Off-duty**
Number of cigarettes	cigarettes	cigarettes	cigarettes
Number of cigars	cigars	cigars	cigars
Pipes of tobacco	pipes	pipes	pipes
Dips/chew of tobacco	dips/chew	dips/chew	dips/chew

57) On average, how many alcoholic beverages do you **drink** per day when ***off duty***? (***enter zero if you do not use***)

	Before starting current assignment	**Since starting current assignment**
Beer	_____ 12 oz bottles	_____ 12 oz bottles
Wine	_____ glasses	_____ glasses
Liquor	_____ ozs.	_____ ozs.

58) On average, how many **caffeinated** beverages do you drink per day? Cup size is equal to a 12 oz. can of soda. *(please enter zero if you do not use)*

	Before starting current assignment	Since starting current assignment	Off-duty
Coffee	_____ cups	_____ cups	_____ cups
Cola	_____ 12 oz cans	_____ 12 oz cans	_____ 12 oz cans
Tea	_____ cups	_____ cups	_____ cups
Hot chocolate	_____ cups	_____ cups	_____ cups

59) Are you currently on a **diet**?(*check one*) ☐ Yes ☐ No

Questions 60 thru 63 refer to your eating behavior when you are ***OFF DUTY***:

60) How many times do you **eat** during a typical 24 hour period?*(include snacks)* _____ times.

61) In general, how would you describe your usual **appetite**? (*check one*)

Poor	Fair	Good	Excellent

62) During a *typical* 7 day period, how many times do you **eat** each of the following meals? (*circle the number*)

	Number of meals eaten					
Breakfast	0	1	2	3	4	5 or more
Lunch	0	1	2	3	4	5 or more
Dinner	0	1	2	3	4	5 or more

63) How **satisfied** are you with your **eating habits** and overall **eating pattern**? (*check one*)

Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Slight satisfied	Moderately satisfied	Very satisfied

Questions 64 thru 68 refer to your eating behavior when you are ***ON DUTY***:

64) How many times do you **eat** during a typical 24 hour period? ***(include snacks)*** _____ times.

65) How **satisfied** are you with your **eating habits** and overall **eating pattern**? (***check one***)

Very dissatisfied	Moderately dissatisfied	Slightly dissatisfied	Slight satisfied	Moderately satisfied	Very satisfied

66) During a ***typical*** 7 day period, how many times do you **eat** each of the following meals? (***circle the number***)

	Number of meals eaten					
Breakfast	0	1	2	3	4	5 or more
Lunch	0	1	2	3	4	5 or more
Dinner	0	1	2	3	4	5 or more

67) In general, how would you describe your usual **appetite** ? (***check one***)

Poor	Fair	Good	Excellent

68) Is your **on duty** diet better or worse than your **off duty** diet? (***check one***)

Much better	Somewhat better	Similar	Somewhat worse	Much worse

The following questions deal with different aspects of work. Please indicate the extent to which these aspects appear in your **present** duty assisgnment. (***check one for each***)

69) **HOW OFTEN:**

	Very often	Fairly often	Some-times	Occa-sionally	Rarely
Does your job require you to work very **fast?**					
Does your job require you to work very **hard?**					
Does your job leave you with little time to get **things done**?					
Is there a great deal to get done?					

70) **HOW MUCH**:

	A great Deal	A lot	Some	A little	Hardly any
How much time do you have to **think** and **contemplate**?					
What **quantity** of work do others **expect** of you?					
How much **time** do you have to do **all** your work?					
How many **projects**, **assignments**, and **tasks** do you have?					
How many **breaks** do you have between work periods?					

71) **HOW OFTEN**:

	Very often	Fairly often	Some-times	Occa-sionally	Rarely
Are your work objectives well defined?					
Are you clear about what others expect of you on the job?					
Can you predict what others expect of you on the job?					
Are you clear on what your job responsibilities are?					

72) To what extent does **fatigue** affect your performance at **work**? (***check one***)

Not at all		Somewhat		Very much

73) The following questions relate to **general job satisfaction**, and **not** to your satisfaction with your work schedule. (***check the appropriate response***)

	Disagree strongly	Generally disagree	Neutral	Generally agree	Agree strongly
Generally speaking, I am very satisfied with this job					
Frequently, I think of quitting this job					
I am generally satisfied with the kind of work I do in					
Most people on this job are very satisfied with the job					
People on this job often think of quitting					

74) How much does each of the following people go out of their way to do things to make your work life easier for you? (***check one for each***)

	Very much	Somewhat	A little	Not at all
Immediate boss or supervisor				
Other people at work				
Your partner, friends and relatives				

75) How easy is it to **talk** with each of the following people? ***(check one for each)***

	Very much	Somewhat	A little	Not at all
Immediate boss or supervisor				
Other people at work				
Your partner, friends and relatives				

76) How much can each of these people be **relied on** when things get tough at work? ***(check one for each)***

	Very much	Somewhat	A little	Not at all
Immediate boss or supervisor				
Other people at work				
Your partner, friends and relatives				

77) How much is each of the following people **willing to listen** to your personal problems?***(check one for each)***

	Very much	Somewhat	A little	Not at all
Immediate boss or supervisor				
Other people at work				
Your partner, friends and relatives				

78) The following set of items deal with the use of your **skills** and **abilities**. Indicate by **checking** the appropriate box, ***how often*** you use each.

	Rarely	Occa-sionally	Some-times	Often
Does your job let you use the skills and knowledge you learned in school?				
Are you given the chance to do the things you do **best**?				
Can you use skills from your previous experience and training				

Questions 79 thru 82 list 8 different strategies people can use to **cope** with problems they experience. In relation to the different problem areas stated below, please indicate by **checking** the appropriate box the extent to which you use (or have used) each of the coping strategies listed.

79) To what extent do **you** use the following strategies when you have problems with your **social life** (e.g. going out, visiting friends, etc.) caused by your current work assignment? ***(check one for each)***

	Not used	Used a little	Used some-what	Used quite a bit	Used a great deal
I work on solving the problems in the situation					
I reorganize the way I look at the situation, so things don't look so bad					
I let my emotions out					
I talk to someone about how I am feeling					
I avoid thinking or doing anything about the situation					
I wish the situation would go away or somehow be over with					
I criticize myself for what is happening					
I spend more time alone					

80) To what extent do **you** use the following strategies when you have problems with your **domestic life** (e.g. domestic tasks, jobs around the house, child care, etc.) caused by your current work assignment? ***(check one for each)***

	Not used	Used a little	Used some-what	Used quite a bit	Used a great deal
I work on solving the problems in the situation					
I reorganize the way I look at the situation, so things don't look so bad					
I let my emotions out					
I talk to someone about how I am feeling					
I avoid thinking or doing anything about the situation					
I wish the situation would go away or somehow be over with					
I criticize myself for what is happening					
I spend more time alone					

81) To what extent do **you** use the following strategies when you have problems with **your sleep** (e.g. problems falling asleep, disrupted sleep, etc.) caused by your current work assignment? ***(check one for each)***

	Not used	Used a little	Used some-what	Used quite a bit	Used a great deal
I work on solving the problems in the situation					
I reorganize the way I look at the situation, so things don't look so bad					
I let my emotions out					
I talk to someone about how I am feeling					
I avoid thinking or doing anything about the situation					
I wish the situation would go away or somehow be over with					
I criticize myself for what is happening					
I spend more time alone					

82) To what extent do **you** use the following strategies when you have problems with the way you perform **your work** (e.g. job performance, organization of work tasks, etc.) caused by your current work assignment?***(check one for each)***

	Not used	Used a little	Used some-what	Used quite a bit	Used a great deal
I work on solving the problems in the situation					
I reorganize the way I look at the situation, so things don't look so bad					
I let my emotions out					
I talk to someone about how I am feeling					
I avoid thinking or doing anything about the situation					
I wish the situation would go away or somehow be over with					
I criticize myself for what is happening					
I spend more time alone					

83) How would you describe your **working relationship** with other crew members? ***(check one)***

Poor	Fair	Good	Excellent

84) Some of the things people do in their life **off the job** are listed below. How do **you** feel about the opportunity you have for each of these activities? (***Check one space for each activity below***)

ACTIVITIES:	Pleased	Mostly satisfied	Mixed	Mostly dissatisfied	Unhappy
Household work and maintenance					
Shopping					
Being with spouse or partner (if applicable)					
Raising children (if applicable)					
Eating meals					
Sleeping					
Entertainment					
Exercise and sports					
Contact with friends					
Taking part in organizations					
Education or training					
Keeping up with news					

85) Please rate how **important** it is for **you** to have time to engage in each of the following activities. (***Check one space for each activity below***)

ACTIVITIES:	Very important	Quite important	Somewhat important	A little important	Not at all important
Household work and maintenance					
Shopping					
Being with spouse or partner (if applicable)					
Raising children (if applicable)					
Eating meals					
Sleeping					
Entertainment					
Exercise and sports					
Contact with friends					
Taking part in organizations					
Education or training					
Keeping up with news					

86) Here are some questions regarding the way you behave, feel and act. Try to decide which response option represents your ***typical*** way of acting or feeling. There are no right or wrong answers to any of the questions: your **immediate reaction** is what we want. Please check that you have answered all of the questions. ***(check one box for each)***

	Almost never	Quite seldom	Quite often	Almost always
Do you like plenty of excitement and bustle around you?				
Does your mood go up and down?				
Are you rather lively?				
Do you feel 'just miserable' for no good reason?				
Do you like mixing with people?				
When you get annoyed, do you need someone to talk to?				
Would you call yourself happy-go-lucky?				
Are you troubled about feelings of guilt?				
Can you let yourself go and enjoy yourself a lot at a lively party?				
Would you call yourself tense or 'high strung'?				
Do you like practical jokes?				
Do you suffer from sleeplessness?				

87) On a normal workday, how **physically tired** do you usually feel at the **end** of the work period? ***(check one)***

Not at all	A little	Quite a bit	Extremely

88) On a normal workday, how **mentally tired** do you usually feel at the **end** of the work period? ***(check one)***

Not at all	A little	Quite a bit	Extremely

89) On a normal workday, how **tense** do you usually feel at the **end** of the work period? ***(check one)***

Not at all	A little	Quite a bit	Extremely

90) How **tense** do you feel in the following situations: ***(check one for each)***

	Not at all	A little	Quite a bit	Extremely
Waiting for a case				
On the way to a case				
At the case location				
On the way back from the case				
Upon return from the case				

91) How **tired** do you feel in the following situations: ***(check one for each)***

	Not at all	A little	Quite a bit	Extremely
Waiting for a case				
On the way to a case				
At the case location				
On the way back from the case				
Upon return from the case				

92) How **alert** do you feel in the following situations: ***(check one for each)***

	Not at all	A little	Quite a bit	Extremely
Waiting for a case				
On the way to a case				
At the case location				
On the way back from the case				
Upon return from the case				

93) How much do the following factors contribute to feelings of **tiredness**, **fatigued**, and/or decreased **alertness** ***during missions***? ***(check one for each)***

	Not at all	A little	Quite a bit	Extremely
Length of time on missions				
Boredom				
Weather				
Work schedule				
Workload				
Boat design/characteristics				
Sea state				
Time of day				
Pre-mission workload at station				

94) How long into a mission do **you** feel **tired**, **fatigued**, and/or decreased **alertness**? ***(fill in blanks)***

_____ hours _____ minutes

95) If you feel **tired**, **fatigued**, and/or decreased **alertness**, what do you do to combat it and remain efficient? ***(rank your TOP three choices: 1 = highest, 2 = second highest, and 3 = third highest)***

_____ a) Drink coffee/soda, or eat candy/snacks, etc
_____ b) Stretch, perform light exercise, isometrics, etc.
_____ c) Take rest breaks, etc.
_____ d) Try to keep busy, work on projects, training
_____ e) Rotate among duties/tasks
_____ f) Other_____
_____
_____ g) I never feel performances decrements during missions

96) How long into a mission do **you** feel your **performance** decreasing? ***(fill in blanks)***

_____ hours _____ minutes

97) How much do the following factors contribute to decreases in **performance** ***during missions***? ***(check one for each)***

	Not at all	A little	Quite a bit	Extremely
Length of time on missions				
Boredom				
Weather				
Work schedule				
Workload				
Boat design/characteristics				
Sea state				
Time of day				
Pre-mission workload at station				

98) If you feel **performance** decreasing, what do you do to combat it and remain efficient? ***(rank your TOP three choices: 1 = highest, 2 = second highest, and 3 = third highest)***

_____ a) Drink coffee/soda, or eat candy/snacks, etc
_____ b) Stretch, perform light exercise, isometrics, etc.
_____ c) Take rest breaks, etc.
_____ d) Try to keep busy, work on projects, training
_____ e) Rotate among duties/tasks
_____ f) Other_____
_____
_____ g) I never feel performances decrements during missions

99) On average, how much time do you spend performing **non-operational** duties, duties which are **NOT** Coast Guard mission related (boat and station maintance, paper-work, etc..), **per week**? ***(fill in blanks)***

_____ days _____ hours _____ minutes

100) What are the three **best features** of your current CG billet?

a) _____

b) _____

c) _____

101) What are the three **worst features** of your current CG billet?

a) _____

b) _____

c) _____

102) Do you feel that overall the **advantages** of your current billet outweigh the **disadvantages**? ***(check one)***

Definitely not	Generally no	Sometimes	Generally yes	Definitely yes

Questions 103 thru 105 ask you to design the ***ideal*** job for **yourself**. How would you design your ideal job on the following characteristics?

103) Number of days '**on**'/'**off**' duty during a seven day period of your **ideal** work schedule:

	Days 'on' duty	Days 'off' duty
Weekdays	days	days
Weekends	days	days

104) The '**start**' **and** '**end**' times of your **ideal** work schedule: ***(fill in military time)***

	Start time	End time
Weekdays		
Weekends		

105) How would your **ideal** job differ from your **present** job on the following: (***check one***)

	Definitely increase	Probably increase	Stay the same	Probably decrease	Definitely decrease
Amount of work					
Pace of work					
Amount of responsibility					
Amount of supervision					
Amount of free time to do own thing					
Quality of work					
Number of work breaks					
Variety of work					

106) About how many miles do you travel (**one-way**) to your present assignment? _____ (***miles***)

107) How long does it take you to travel to present assignment? _____ (***minutes***)

108) Do you car pool or use public transportation to get to your present assignment? ☐ Yes ☐ No

109) Below is a list of **work characteristics**, please rate how well you think you were prepared for these characteristics as part of your present duty assignment? (***check one box for each activity***)

	Not at all	A little	Quite a bit	Extremely
Food preparation				
Housekeeping				
Supervision				
Sleeping facilities				
Work scheduling				
Head facilities				
Shower facilities				
Training				
Food allowance				
Housing allowance				
Boat maintenance				
Station maintenance				
Paper work				

110) Below is a list of **work characteristics**, please rate how well you think these characteristics are handled in your present duty assignment? (***check one box for each activity***)

	Not at all	A little	Quite a bit	Extremely
Selection of crew members				
Communication links				
Collecting operational information				
Ordering supplies				
Food allowance				
Housing allowance				
Food preparation				
Housekeeping				
Supervision				
Sleeping facilities				
Work scheduling				
Head facilities				
Shower facilities				
Training				
Boat maintenance				
Station maintenance				
Paper work				
Recreational facilities				

111) Knowing what you know now, if you had to decide all over again whether to accept your current billet, what would you decide? (***check one***)

Decide without hesitation to take the same type of job	Have some second thoughts	Decide definitely not to take this type of job

112) If a friend of yours told you he/she was interested in a billet like yours, what would you tell him/her? (***check one***)

Strongly recommend it	Have doubts about recommending it	Advise him against it

113) All in all, how would you rate the Coast Guard as an organization to work for? (*check one*)

Extremely good	Very good	Fairly good	Average	Fairly poor	Very poor	Extremely poor

114) If a friend of yours told you he/she was interested in joining the Coast Guard, what would you tell him/her? (*check one*)

Strongly recommend it	Have doubts about recommending it	Advise him against it

115) How often do you feel the following things about your job? (*check one box for each*)

	Very often	Fairly often	Some-times	Occa-sionally	Rarely
I dislike the amount of work I am expected to do					
I am dissatisfied with the pace of my work					
I am unhappy about my current work load					
My work is interesting to do					
I feel bored with the work I have to do					
The work on my job feels dull					

116) If you were to <u>leave</u> the Coast Guard, what would be your <u>main</u> reasons?
(*rank your TOP three choices: 1 = highest, 2 = second highest, and 3 = third highest)*

_____a) to change my job duties
_____b) to have more opportunity for off the job activities
_____c) to obtain an improved working environment
_____d) to earn better pay
_____e) better working hours
_____f) better opportunity for promotion
_____g) medical restrictions

117) Do you have second job(s) for additional income? ☐ Yes ☐ No

If <u>YES</u>, how many hours a week do you work at the other job(s)? _____ hours

118) How acceptable or unacceptable do you find the use of **this survey** as a method to help in the evaluation of your work environment? (***check one***)

Very acceptable	Moderately acceptable	Slightly acceptable	Moderately unacceptable	Very unacceptable

119) Please note anything related to your work, sleep, fatigue level, etc. that you feel is important, but has not been addressed by this survey.

_____

_____

_____

_____

_____

_____

_____

THANK YOU FOR COMPLETING THIS SURVEY!!!!

APPENDIX B

COMPLETE THIS LOG AT BREAKFAST TIME

DATE COMPLETED:_____ **TIME COMPLETED:**_____ *(MILITARY TIME)*

1) Are you on duty? ☐ Yes ☐ No

2) Choose the statement below which best describes your present feelings. How do you feel right now? (*check one*)

- ☐ Feeling active and vital; alert; wide awake
- ☐ Functioning at a high level , but not at a peak; able to concentrate
- ☐ Relaxed; awake; responsive; but not at full alertness
- ☐ A little foggy; let down; not at peak
- ☐ Foggy; slowed down; beginning to lose interest in remaining awake
- ☐ Sleepy; woozy; prefer to be lying down; fighting sleep
- ☐ Almost in reverie; sleep onset soon; losing struggle to remain awake

3) For each item below, choose one of the four answers that best describe how you feel now:

Item	Not at all	A little	Quite a bit	Extremely
Active				
Alert				
Annoyed				
Carefree				
Cheerful				
Able to concentrate				
Considerate				
Defiant				
Dependable				
Drowsy				
Dull				
Efficient				
Friendly				
Full of Pep				
Good-natured				

Item	Not at all	A little	Quite a bit	Extremely
Grouchy				
Happy				
Jittery				
Kind				
Lively				
Pleasant				
Relaxed				
Satisfied				
Sleepy				
Sluggish				
Tense				
Able to think clearly				
Tired				
Able to work hard				

Questions 4 thru 8 (below) refer to your most recent main sleep period:

4) Where did you sleep? (*check one*) ☐ Home ☐ Boat ☐ Other (*specify*)_____

5) At what time did you go to bed _____ (*military time*) and at what time did you get-up _____(*military time*)?

6) How many times did you **awaken** during the night? _____ (*number of times*)

7) How long did it take you to **fall** asleep? _____ (*minutes*)

8) Please **rate** the following questions which refer to your most **recent** sleep period: (*check the box*)

	Not at all	A little	Quite a bit	Extremely
Had difficulty falling asleep?				
Had difficulty staying asleep?				
Woke up during the night?				
Had difficulty getting up in the morning?				
Had restless or disturbed sleep?				
Disturbed the sleep of other people?				
Woke-up disoriented, confused, irritable?				

9) If you were on **duty** last night, did you **respond** to any **calls** during the night? ☐ Yes ☐ No

If **Yes,** continue with question number 10. If **No,** ***END OF THIS LOG!***

10) What **type** of call was it/were they? (*specify*) 1)_____ 2) _____ 3) _____

11) How long were you **underway** for each call? (*fill in*) 1) ____ hr ____min 2) ____hr ____min 3) ____hr ____min

12) How long have you been back from the last call? _____ hr _____ min

13) How **tense** did you feel during the following situations on your **last** call?

	Not at all	A little	Quite a bit	Extremely
Waiting for a call at the dock				
On the way to the call				
At the call location				
On the way back from the call				
Upon return from the call				

14) How **tired** did you feel during the following situations on your **last** call?

	Not at all	A little	Quite a bit	Extremely
Waiting for a call at the dock				
On the way to the call				
At the call location				
On the way back from the call				
Upon return from the call				

15) How **alert** did you feel during the following situations on your **last** call?

	Not at all	A little	Quite a bit	Extremely
Waiting for a call at the dock				
On the way to the call				
At the call location				
On the way back from the call				
Upon return from the call				

COMPLETE THIS LOG AT DINNER TIME

DATE COMPLETED: _____ **TIME COMPLETED:** _____ (*MILITARY TIME*)

1) Choose the statement below which best describes your present feelings. How do you feel right now? (*check one*)

- ☐ Feeling active and vital; alert; wide awake
- ☐ Functioning at a high level , but not at a peak; able to concentrate
- ☐ Relaxed; awake; responsive; but not at full alertness
- ☐ A little foggy; let down; not at peak
- ☐ Foggy; slowed down; beginning to lose interest in remaining awake
- ☐ Sleepy; woozy; prefer to be lying down; fighting sleep
- ☐ Almost in reverie; sleep onset soon; losing struggle to remain awake

2) For each item below, choose one of the four answers that best describe how you feel now:

Item	Not at all	A little	Quite a bit	Extremely
Active				
Alert				
Annoyed				
Carefree				
Cheerful				
Able to concentrate				
Considerate				
Defiant				
Dependable				
Drowsy				
Dull				
Efficient				
Friendly				
Full of Pep				

Item	Not at all	A little	Quite a bit	Extremely
Good-natured				
Grouchy				
Happy				
Jittery				
Kind				
Lively				
Pleasant				
Relaxed				
Satisfied				
Sleepy				
Sluggish				
Tense				
Able to think clearly				
Tired				
Able to work hard				

3) Are you on duty?

☐ Yes ☐ No If Yes, continue with question number 4. If No, *END OF THIS LOG!*

4) Have you responded to any calls today?

☐ Yes ☐ No If Yes, continue with question number 5. If No, *END OF THIS LOG!*

COMPLETE THIS LOG AT DINNER TIME

5) What **type** of call was it/were they? (*specify*) 1)_____ 2) _____ 3) _____

6) How long were you **underway** for each call? (*fill in*) 1) ____ hr ____min 2) ____hr ____min 3) ____hr ____min

7) Overall, rate the environmental conditions **during** the call/calls? (***check one***)

Very calm	Moderately calm	Slightly calm	Slightly severe	Moderately severe	Very severe

8) How long have you been back from the last call? ____hr ____ min

9) How **tense** did you feel during the following situations on your **last** call?

	Not at all	A little	Quite a bit	Extremely
Waiting for a call at the dock				
On the way to the call				
At the call location				
On the way back from the call				
Upon return from the call				

10) How **tired** did you feel during the following situations on your **last** call?

	Not at all	A little	Quite a bit	Extremely
Waiting for a call at the dock				
On the way to the call				
At the call location				
On the way back from the call				
Upon return from the call				

11) How **alert** did you feel during the following situations on your **last** call?

	Not at all	A little	Quite a bit	Extremely
Waiting for a call at the dock				
On the way to the call				
At the call location				
On the way back from the call				
Upon return from the call				

COMPLETE THIS LOG BEFORE NIGHTLY SLEEP

DATE COMPLETED: _____ **TIME COMPLETED:** _____ *(MILITARY TIME)*

1) Choose the statement below which best describes your present feelings. How do you feel right now? (*check one*)

- ☐ Feeling active and vital; alert; wide awake
- ☐ Functioning at a high level , but not at a peak; able to concentrate
- ☐ Relaxed; awake; responsive; but not at full alertness
- ☐ A little foggy; let down; not at peak
- ☐ Foggy; slowed down; beginning to lose interest in remaining awake
- ☐ Sleepy; woozy; prefer to be lying down; fighting sleep
- ☐ Almost in reverie; sleep onset soon; losing struggle to remain awake

2) For each item below, choose one of the four answers that best describe how you feel now:

Item	Not at all	A little	Quite a bit	Extremely
Active				
Alert				
Annoyed				
Carefree				
Cheerful				
Able to concentrate				
Considerate				
Defiant				
Dependable				
Drowsy				
Dull				
Efficient				
Friendly				
Full of Pep				

Item	Not at all	A little	Quite a bit	Extremely
Good-natured				
Grouchy				
Happy				
Jittery				
Kind				
Lively				
Pleasant				
Relaxed				
Satisfied				
Sleepy				
Sluggish				
Tense				
Able to think clearly				
Tired				
Able to work hard				

3) Are you on duty?

☐ Yes ☐ No If Yes, continue with question 4. If No, skip to question number 12.

4) Have you responded to any calls since your last survey entry?

☐ Yes ☐ No If Yes, continue with question 5. If No, skip to question 12.

COMPLETE THIS LOG BEFORE NIGHTLY SLEEP

5) What type of call was it/were they? (*specify*) 1)_____ 2) _____ 3) _____

6) How long were you underway for each call? (*fill in*) 1) ____ hr ____min 2) ____hr ____min 3) ____hr ____min

7) How long have you been back from the last call? _____ hr _____ min

8) On average, rate the environmental conditions during the call/calls?

Very calm	Moderately calm	Slightly calm	Slightly severe	Moderately severe	Very severe

9) How tense did you feel during the following situations on your last call?

	Not at all	A little	Quite a bit	Extremely
Waiting for a call at the dock				
On the way to the call				
At the call location				
On the way back from the call				
Upon return from the call				

10) How tired did you feel during the following situations on your last call?

	Not at all	A little	Quite a bit	Extremely
Waiting for a call at the dock				
On the way to the call				
At the call location				
On the way back from the call				
Upon return from the call				

11) How alert did you feel during the following situations on your last call?

	Not at all	A little	Quite a bit	Extremely
Waiting for a call at the dock				
On the way to the call				
At the call location				
On the way back from the call				
Upon return from the call				

12) Overall,, how would you rate this day ? (*check one*)

Very good	Good	Somewhat good	Somewhat bad	Bad	Very bad

What factors contributed to this rating? _____

_____

COMPLETE THIS LOG BEFORE NIGHTLY SLEEP

13) On the whole, how would you rate your <u>day</u> on the following items? (***check the appropriate box***)

	Extremely low	Quite low	Average	Quite high	Extremely high
Physical workload					
Mental workload					
Pace of work					
Boredom					
Alertness					
Activity level					
Stress					
Sleepiness					
Fatigue					
Tension					

14) On the whole, how **often** did you feel the following <u>symptoms</u> <u>TODAY</u>? (***check the appropriate box***)

	Not at all	A little	Quite a bit	Extremely often
Headaches				
Nausea				
General ill feeling				
Upset stomach				
Tiredness				
Stomach cramps				
Dizziness				
Difficulty thinking				
Back pain				
Bloated or feeling full				
Blurred vision				
Acid indigestion, heartburn, or acid stomach				
Dry heaves (retching)				
Vomiting				

15) Did you work a ***second*** job today? ☐ Yes ☐ No

If Yes, at what time (*military time*) did you <u>start</u> and <u>end</u>? <u>START:</u>_____ <u>END:</u>_____

COMPLETE THIS LOG BEFORE NIGHTLY SLEEP

16) Did you take any **naps** today? ☐ **Yes** ☐ **No**

If Yes, what was the total time spent napping? _____ **hr** _____ **min**

17) On the whole, for **TODAY**, how would you rate the acceptability of each of the following items? (***check the appropriate box***)

	Extremely low	Quite low	Average	Quite high	Extremely high
Privacy					
Interactions with others					
Weather					
Food preparation					
Cleanliness/hygiene of others					
Food quality					
Sleeping conditions					
Head facilities					
Your cleanliness/hygiene					
Exercise					
Leisure time					

Please list any **out of the ordinary** events that occured **TODAY** which may have affected your responses to the surveys and/or any other comments you may have? (***please specify***)

Comment: _____

_____

_____

_____

_____

THANK YOU